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ABSTRACT

The underrepresentation of minority females in mathematics and science occupations raises questions about the role of secondary school counselors in the career choices of these students. Data from a mail survey of school counselors and guidance directors (N=125) were analyzed to examine the relationship of two dependent variables, i.e., enrollment of black female students in non-required mathematics courses and in non-required science courses and three independent variables, i.e., counselor demographic characteristics, characteristics of guidance programs, and counseling and guidance practices. None of the counselor demographic characteristics were statistically related to enrollment. In terms of the characteristics of guidance programs, only the "autonomy of counselors" variables were statistically related to both dependent variables. For counseling and guidance practices, the variable, "special efforts used to encourage black females to enroll in non-required mathematics and science courses," was significantly related to enrollment of black female students in mathematics courses. The variable, "amount of involvement counselors report in specific counseling and guidance practices," was statistically significant in relation to enrollment of black female students in non-required science courses. (NRB)

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Technical Report No. 570

RELATIONSHIP OF COUNSELING FACTORS TO MINORITY FEMALES' PARTICIPATION IN MATHEMATICS AND SCIENCE

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Rubie J. Harris

Report from the Project on
Minority Female Involvement in High School Science and Mathematics

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CG 015162

Wisconsin Research and Development Center
for Individualized Schooling
University of Wisconsin
Madison, Wisconsin

November 1980

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DEDICATION

To My Parents

Mrs. Bessie Harris and Mr. Lattie Harris

And My Mentors

Dr. J. B. Jones and Dr. John L. Holland

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RELATIONSHIP OF COUNSELING FACTORS TO MINORITY FEMALES' PARTICIPATION IN MATHEMATICS AND SCIENCE

Rubie J. Harris

Under the supervision of Professor Patricia L. Wolleat

Abstract

The purpose of this investigation was to examine the relationship between selected school counselor characteristics and enrollment of black female students in non-required mathematics and science courses. Specifically, the investigator sought to determine whether the enrollment of black female students in non-required mathematics and science courses varied according to the characteristics of counselors, the characteristics of guidance programs, and counseling and guidance practices.

A direct mail survey was used. Of 157 questionnaires sent to counselors and guidance directors, 132 (84 percent) were completed and returned; 125 (79 percent) of these were usable for this study.

Chi square and forward stepwise multiple regression analyses were employed to examine the relationship of two dependent variables (enrollment of black female students in non-required mathematics courses and in non-required science courses) and three categories of independent variables: (a) demographic characteristics of counselors; (b) characteristics of guidance programs; and (c) counseling and guidance practices. Category A included (a) ethnic

background; (b) sex; (c) age; (d) educational background; and (e) professional experience. Category B included (a) organization of guidance programs; (b) philosophy of guidance programs; (c) counselor/student ratio; and (d) autonomy of counselors. Category C included (a) amount of involvement in specific counseling and guidance activities; (b) amount of time spent with students in educational and career planning, personal and/or social adjustment, and other job related activities; (c) prerequisites considered important when enrolling students in non-required mathematics and science courses; (d) how often students (black females) request assistance about taking non-required mathematics and science courses; and (e) special efforts used to enroll black females in non-required mathematics and science courses.

None of the demographic characteristics of counselors were statistically related to enrollment. In the category, characteristics of guidance programs, only the "autonomy of counselors" variables were statistically related to both dependent variables. In the category, counseling and guidance practices, the variable, "special efforts used to encourage black females to enroll in non-required mathematics and science courses" was significantly related to enrollment of black female students in mathematics courses. The "amount of involvement counselors report in specific counseling and guidance practices" variable was statistically significant in relation to enrollment of black female students in non-required science courses.

Based on these findings, several implications for secondary school counseling and future research were suggested.

DEC 0 2 1980

APPROVED: Patricia L. Wolleat
Patricia L. Wolleat

DATE: 11/24/80

CHAPTER I

INTRODUCTION

In recent years the underrepresentation of minority females in mathematics and science occupations has caused some educators to ask questions regarding the role of secondary school counselors in the pursuit of such careers by these students. In 1977, Burlew reported that in spite of increases in females' participation in male-dominated professions, they are still underrepresented. For example, in the "fields of law and medicine, the percentage of women is disproportionally low--4.7% and 9%, respectively" (p. 89). For black females, the percentage is even lower. Burlew reported that "the percentage of Black women in each of six male-dominated professions--medicine, law, non-health technical professions, engineering, physical and social, and college teaching--is less than 1 percent" (p. 88).

To explain the low participation of black women in these professions, Burlew noted that these women are underrepresented in attending colleges and universities and that those who are attending "tend to choose careers in traditionally feminine fields" (p. 88). Gurin and Gaylord (1975) found in their survey of college women that the majority of black women were interested in traditional careers. One reason for this might be that these "feminine" careers often require only minimal coursework in mathematics and science.

Williams (1979), in a study of both male and female minority students, reported that "minority students continue in a disproportionate number to enter traditional areas of study . . . as opposed to the more 'economically profitable' professional and technical areas. . . ." (p. 176). In order to ensure change, Williams suggested that school counselors "should be oriented and exposed" to career awareness, career exploration, and career preparation. If black females were exposed to more courses in mathematics and science earlier in their academic development, perhaps more of them would concentrate on mathematics and science careers in college. According to Scott (1977), the reality is that "the number of black high school graduates with prerequisites to enter college as mathematics and science majors is decreasing more rapidly than the national average" (p. vii). Therefore, a very important question for school counselors is "What can counselors do to encourage black females' involvement in non-required mathematics and science courses?"

Some researchers have observed that secondary school counselors have actively discouraged female students from taking mathematics. For example, Casserly (1975) found that counselors discouraged females from taking mathematics because it might conflict with their extracurricular activities during their senior year. In a similar vein, Casserly (1978) found that counselors supported female students' desire to drop mathematics "since they're getting B's or C's which aren't too good for [their] cumulative average" (p. 4). Luchins (1977) also studied many high schools "where counselors admitted discouraging girls from pursuing mathematics because they did not think it offered opportunities for them" (p. 164).

While these findings are discouraging, some counselors have admitted that they need help in encouraging black female students' enrollment in non-required mathematics courses. These counselors might benefit from training modules to provide them with skills for assisting in the educational and vocational development of black females.

Statement of the Problem

The purpose of this study was to investigate the relationship between selected characteristics and activities of school counselors and the enrollment of black female students in non-required mathematics and science courses in secondary schools. More specifically, the following questions were examined:

1. Does the enrollment of black females in non-required mathematics and science courses vary systemically according to demographic characteristics of counselors?
2. Does the enrollment of black females in non-required mathematics and science courses vary systemically according to characteristics of guidance programs?
3. Does the enrollment of black females in non-required mathematics and science courses vary systemically according to counseling and guidance practices?

This study was exploratory in nature; the investigator examined the relationship among the variables, rather than testing hypotheses.

Since the investigator's professional experiences are in postsecondary education, it was necessary to consult several school counselors and counselor educators regarding the choice and categorization of variables used in this study. Although many variables were discussed, the school counselors suggested what variables they thought might make a difference in the way counselors encourage black females to enroll in non-required mathematics and science courses.

Demographic Characteristics of Counselors

There is conflicting evidence as to whether school counselors affect students' vocational/occupational choices. Some researchers suggest that counselors' characteristics such as sex, age, ethnic background, educational background, and professional experience do have a significant influence on how they work with students and perhaps ultimately on the career choices of female students. A few studies (Backner, 1970; Ewing, 1974; Harway, 1976; Person, 1972; Scott, 1977) suggest that counselors differ in the support that they give female students for pursuing non-traditional careers according to such variables as their sex, age, ethnic background, or professional experiences of the counselors. While these researchers' emphasis has been on females in general, it seems likely that the variables would be related to the support counselors give to black females. Other studies (Casserly, 1978; Luchins, 1977) report that male and female counselors do not differ in the extent to which they encourage or discourage females from taking mathematics courses. Still other studies (Backner, 1970; Birk, 1974; Engelhard, Jones, & Stiggins, 1976; Friedersdorf, 1970; Pietrofesa & Scholsberg, 1971; Thomas & Stewart, 1971) suggest that some counselors discourage females from pursuing non-traditional careers but that there are no systematic differences among counselors.

In view of the conflicting evidence, the first objective of this study was to determine if selected characteristics of counselors are related to the enrollment of black female students in non-required mathematics and science courses. The specific variables examined were sex, age, ethnic background, educational background (e.g., undergraduate major), and professional experience (e.g., number of years of full-time counseling experience).

Characteristics of Guidance Programs

Literature regarding the characteristics of guidance programs consists primarily, not of research studies, but of general views from various authorities in the field of guidance and counseling (Aubrey, 1979; Peters & Shertzer, 1974; Shertzer & Stone, 1971; Wrenn, 1962). Some authors suggest organizational models that might be used when setting up guidance programs (Fazzaro & Gillespie, 1972). Other authors (Aubrey, 1979; Finley & Shertzer, 1967; Peters & Shertzer, 1974; Shertzer & Stone, 1971) express their views on the importance of various characteristics of guidance programs (e.g., counselor/student ratio and philosophy of guidance programs).

Because of the lack of empirical studies related to these characteristics, a second objective of the investigation was to determine if selected characteristics of guidance programs and the services provided by guidance programs are related to the enrollment of black females in non-required mathematics and science courses. The specific variables examined were organization of guidance services (e.g., how students are assigned to counselors), philosophy of guidance programs (e.g., importance of providing equal opportunity for all students), counselor/student ratio, and autonomy of counselors (e.g., in establishing student conduct rules in the school).

Characteristics of Counseling and Guidance Practices

While the role of counselors has been perceived in different ways by principals, teachers, students, parents, and counselors, the actual duties counselors perform suggest that educational and vocational planning and individual counseling are important functions in assisting students (Hertzog, 1962; Wrenn, 1972). A third objective of the investigation was to determine if certain counseling and guidance practices are related to the enrollment of black females in non-required mathematics and science courses. The specific variables examined were (a) amount of involvement counselors report in specific counseling and guidance activities (e.g., providing career day programs); (b) amount of time counselors spend with students in educational career development, personal/social adjustments, and other job related activities (e.g., high school educational planning); (c) prerequisites considered most important when enrolling students in non-required mathematics and science courses (e.g., cumulative grade point average); (d) how often students request assistance in making decisions about taking non-required mathematics and science courses; and (e) special efforts used to encourage black females to enroll in non-required mathematics and science courses.

Significance of the Study

According to John Krumboltz, " . . . if we continue to test our new ideas, we shall gradually accumulate some reliable knowledge about which kinds of procedures will work best, for which purpose, and under what kind of circumstances" (quoted in The Institute For Services to Education, p. 49). For counselors, the results of this study may provide information on how services are delivered to a designated population.

For counselor educators, the results might be useful in program planning (e.g., in individual schools, degree programs, workshops, etc.) for counselors whose responsibilities include or will include assisting black females in educational and career planning.

In general, the results may suggest ways in which counselors may encourage black females to enroll in non-required mathematics and science courses.

Procedures in the Study

This study was part of a larger study conducted by the Wisconsin

Research and Development Center for Individualized Schooling* to determine

> . . . the organizational characteristics of schools and the background and attitudinal traits of teachers and counselors which seemingly contribute to (1) high participation by black females in non-required mathematics and science courses, and (2) high enrollment/involvement in science fairs, clubs, and similar extra-curricular activities related to science. (p. iii)

For the purpose of the larger study, questionnaires were sent, in the early spring 1980 to mathematics and science teachers, selected homeroom teachers, and counselors and guidance directors in 46 secondary schools, selected by the project director, located throughout the United States. The counselor questionnaire, constructed by this investigator, was included for distribution to counselors and guidance directors only. Designated coordinators in the schools distributed the questionnaires and returned them to the project director in the Wisconsin Research and Development Center for Individualized Schooling.

Definition of Terms

The following terms are operationally defined as they were used throughout the study:

Counseling: a relationship in which counselors seek to help students learn about themselves and their environment, and to use that understanding in establishing goals and behavior which will lead to optimum development.

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*Project on Minority Female Involvement In High School Science and Mathematics. Funded by NIE under Grant No.: NIE-G-79-0110.

Counseling practices: techniques used by counselors when assisting students.

Demographic variables: characteristics of counselors that are associated with personal information (e.g., sex, age, etc.).

Guidance: a process of helping students to understand their environment by providing services which will lead to optimum development.

Non-required mathematics and science courses: courses that are not considered general requirements for high school graduation.

Non-traditional careers: occupations in which females and black females are underrepresented (e.g., law, medicine, engineering, etc.).

Traditional careers: occupations that have been identified as feminine fields (e.g., education, social services, clerical, etc.).

Vocational/Occupational planning: a process of helping a student recognize her assets and limitations regarding the world of work.

CHAPTER II

REVIEW OF THE LITERATURE

This dissertation focuses on the relationship of practices and demographic characteristics of counselors and characteristics of guidance programs to the enrollment of black females in non-required mathematics and science courses. There have been no studies to date on precisely this relationship. There are, however, many works which bear on the various components of the research questions. This literature pertains to (a) occupational and career choices of black females; (b) demographic characteristics of counselors as related to traditional and non-traditional career choices of secondary school females in general and minority students in general; (c) characteristics of guidance programs; and (d) counseling and guidance practices as they relate to all students in secondary schools.

Occupational and Career Choices of Black Females

As stated in Chapter I, black females are underrepresented in non-traditional occupations. Several reasons have been suggested: (a) low career expectations of black females; (b) low expectations of females in general; and (c) lack of non-traditional female role models. A few studies imply that black women, in general, have limited occupational expectations. Gurin and Gaylord (1975) found that the black females in their study of college females expressed interest in such traditional feminine careers as "education, IBM machine operation, fashion design, interior decoration, and social welfare" (p. 88). Further, they found that both black and white females had similar educational goals, and those who expected to attend graduate school would not consider pursuing a degree beyond the masters level.

Perhaps, because they have the limited career expectations of women in general, black females do not seem to relate mathematics and science courses with mathematics and science careers. Scott (1977) conducted a study "to determine and assess those factors which impact the decisions of black students regarding the pursuit of careers in science and mathematics" (p. vii). Two hundred high school students, 138 college freshmen, 30 secondary school counselors, 37 secondary school teachers, and 15 science employers completed questionnaires and interviews constructed specifically for this study. Scott found that black college female science majors did not associate their interest in science as a major with ultimate goals "of entering a graduate professional school of pursuing a career . . . but [took courses] simply because they enjoyed the discipline" (p. 11).

Davis (1977) suggests that the ideology of traditional women's roles inhibits some black females from pursuing non-traditional occupations. To determine the degree to which traditional women's role orientation might inhibit black women's career preference and aspirations, she selected 105 black female secondary students and measured them on two major dimensions: (a) preference for traditional occupations; and (b) preference for non-traditional occupations. These measures were correlated with measures of "masculinity and femininity." Davis found that women's traditional occupational preferences were not related to "femininity" but rather to their belief in the traditional women's role. Women's non-traditional occupational preferences were found to be related to "masculinity" behaviors but not to the belief in women's role ideology.

The questions Rowe (1977) asked in her article, "Why Don't Blacks Pick Science?" imply that perhaps black students generally lack encouragement from school counselors. For example, he asked, "Are capable black students being encouraged to take mathematics and science courses, and is this happening early enough?" "Are counselors sufficiently well informed?" and "Are science teachers playing a role in career counseling?" While her questions focused on blacks in general, they may be applicable to black females.

Unfortunately, Epstein (1973), Ladner (1974), and Scott (1977) did not reveal positive answers to Rowe's questions. In the cases where black females did succeed, they found parents to be a much more important influence than secondary school counselors. Epstein found that black professional women as children had received as much encouragement for their ambitions from their families as white males did from "upward-striving" families. Ladner's study of black girls suggested that their families encouraged and expected them to excel in their educational and vocational/occupational aspirations. Harrison (1973) explained Ladner's findings:

> Females in the Black community are highly visible and noted for their strengths, accomplishments in the face of obstacles, and personal sacrifices for their family and the Black community. The young female, therefore, is exposed to successful families and . . . [her] view of what is appropriately female comes from her own community, not from . . . the White world. (p. 13)

Scott found that black students generally, in both high school and college, relied more on their parents than on counselors for career information.

From these findings, it appears that Rowe's questions are ones which school counselors, teachers, and other school personnel need to consider when assisting black females with occupational decisions.

Characteristics of Counselors as Related to Traditional and Non-Traditional Career Choices of Females and Minority Students

Characteristics of counselors such as sex, age, ethnic background, educational background, and professional experience have been found to relate to the career choices of female and minority students.

Sex and Race of Counselors

Studies focusing on the relationship between the sex of counselors and the vocational/occupational choices of females have revealed conflicting findings. In some studies, few differences have been found in the vocational/occupational choices that male and female counselors associated with females. For example, in an experimental study, Thomas and Stewart (1971) divided 18 female and 44 male secondary school counselors into four treatment groups on the basis of sex and experience. Each group heard audio-tapes of female clients expressing "deviant" or "conforming" career choices. After hearing the audio-tapes, counselors were asked to:

> (a) assess the degree to which [they] felt that each of 42 adjectives (Gough Adjective Check List) resembled the client; (b) [assess] . . . the degree to which [they] felt that the career goal was appropriate for the client, (c) [assess] . . . the degree to which [they] felt that the client was in need of additional counseling, (d) [suggest] two additional career choices which [they] felt might be appropriate for the client's further consideration. (p. 353)

The authors reported that, on the whole, counselors, whether male or female, indicated "conforming" career choices as appropriate for female clients and rated those with "deviant" career choices as in "need of counseling." Female counselors, however, gave female clients higher ratings on the Gough Adjective Check List than did the male counselors.

Donahue and Costar (1977) asked 300 high school counselors to choose the most appropriate occupation, from a list of 28 occupations, for 3 male and 3 female case study subjects. " . . . on the back [of each case study] counselors were asked to provide information regarding their sex, marital status, age, professional training and experience, and social economic background" (p. 482). In this study, there was no main effect of sex: (a) counselors chose low paying supervised occupations for females; (b) counselors whose mothers had received only average "formal education" also chose lower occupations for females than for males. However, a sex by age evaluation revealed that female counselors over 40 years of age chose "low occupations" for female students more than the male counselors.

Friedersdorf (1970) found that male and female counselors responded slightly differently when role-playing either a college bound or non-college bound girl. Twenty-seven male and 29 female counselors role-played a college bound girl, while 23 male and 27 female counselors role-played a non-college bound girl. Both groups were administered the Strong Vocational Interest Blank for Women. Both male and female counselors associated traditional careers more with college bound girls than non-college bound girls. However, female counselors presented the college bound girls with more options to choose from than did the male counselors.

In contrast to these findings, some investigators have indicated that the sex of counselors might make a more significant difference in the counseling of females about vocational/occupational choices. Bingham and House (1973a), in a mail questionnaire to secondary school counselors randomly selected from a New Jersey State Department of Education Directory, found male counselors to be less well informed than female counselors about occupational alternatives for women.

In a second study, Bingham and House (1973b) examined the extent to which "negative attitudes about women and work prevail among counselors and counselor educators" (p. 16). Participants from the earlier study were mailed a 50-item questionnaire containing 25 statements of fact and 25 statements of attitude with which they could either agree or disagree. The attitudinal items were statements such as: (a) "Women today want to have their cake and eat it, too; (b) Women in business are good administrators and supervisors" (p. 17). The attitudes of the counselors, in general, were more positive than negative about women and work. Nevertheless, the counselors' attitudes "were less clearly defined than was expected." "Such lack of definition," the researcher stated, "may leave some clients, especially girls, with feelings of uncertainty about where they stand with their counselor" (p. 23). Further, it was suggested that "girls who [felt] uncertain about their counselors might anticipate greater support on some important dimensions of vocational behavior from female rather than from male counselors" (p. 23).

Persons (1972) examined both sex of counselor and race of client as variables that might affect the counselor's encouragement of females, particularly minority females toward various occupations. Thirty-two white counselor trainees (16 females and 16 males) enrolled in a practicum at the University of Florida were randomly selected to participate in the study. The Occupational Prestige Checklist, consisting of 8 bogus client profiles and 65 occupations for use with each profile, was administered to the trainees. Participants were instructed to rank order the five occupations the bogus clients "would enter or be working toward within a 5 year period." The male counselor trainees showed sexual and racial biases, whereas the female counselor trainees did not. The male counselor trainees rank ordered the predictive occupations of male bogus clients "significantly higher" than female bogus clients and predicted very low occupations for black females. In contrast, Flakes (1973) used secondary school counselors in Florida and found that regardless of sex, "both black and white counselors have a tendency to advise blacks away from science related areas of study" (Smith, 1975, p. 2).

Age of Counselors

Few studies, to date, suggest that the age of counselors has an impact on the way they counsel females about career choices. For example, Donahue and Costar (1977) found that age, "in itself, did not make a statistically significant difference. . . . It did [however] interact with other variables such as sex and parental educational level" (p. 485). Engelhard, Jones, and Stiggins (1976) indicated, in a study of counselor attitudes toward women's roles and work, that "regardless of age, guidance personnel continue to grow and remain sensitive to the social milieu within which they and their clients are functioning" (p. 371). While these investigators reported that the age of counselors had not been a significant variable, the number of studies is limited, and there is need for additional research. In recent years, however, the vocational/occupational interests of females have changed. Thus, the views of older and younger school counselors on females pursuing non-traditional careers may now differ.

While some of the researchers suggest that the degree of support that counselors provide females and minority students may vary according to the demographic characteristics examined, the nature of the studies might account for the degree of variation. Some of the studies involved counselors reacting to simulated cases rather than actual clients. Additional research is needed before these specific findings can be generalized to counselors as a whole. From these studies, however, it does appear that the sex and race of counselors may be related to the vocational/occupational choices of females and minority students.

Characteristics of Guidance Programs

This section of the review focuses on the organization and philosophy of guidance programs, counselor/student ratio, and suggested career models that might be implemented in guidance programs to assist minority students, especially black females. The literature in this area has only a few empirical studies; generally, the literature represents opinions from various authorities in the field of guidance and counseling.

Organization of Guidance Programs

Fazzaro and Gillespie (1972) have suggested organizational models that might be helpful when organizing guidance programs: (a) the bureaucratic model; (b) the differentiated role model; (c) the laissez-faire model; and (d) the task group model. The bureaucratic model allows counselors to be assigned to the same grade level year after year, or move with the same class until graduation; the differentiated role model allows counselors to specialize in a particular area (career development, testing). This model gives students an exposure to a variety of specialist counselors. The laissez faire model identifies counselors as generalists; students may choose any counselor for service. Finally, the task group model provides for counselors and other pupil personnel workers to work together when making decisions about students. In this way, students receive assistance from a group of personnel workers instead of individual counselors. While the titles of these models may differ, the principles of the models may be applied to any guidance program that is being organized.

Cicourel and Kituse (1963) and Peters and Shertzer (1974) described other models, without labels, that have been used in organizing guidance programs. For example, in one midwestern school observed by Cicourel and Kituse, students were randomly assigned to one of four divisions within the school. Within each division, one counselor was assigned for each grade level. In order to ensure a cross section of students in each division, special efforts were made to assign high ability students and black students in each division if they had not previously been randomly assigned. This type of organization gave counselors a cross section of students to work with.

Peters and Shertzer described the guidance organization of another midwestern metropolitan school district. Counselors, including two black counselors, were assigned students alphabetically from the tenth, eleventh, and twelfth grades. If a black student felt that she or he could relate better with a black counselor, arrangements were made to transfer. The same process was also applied to a white student who was uncomfortable with a black counselor. From these examples, it is clear that the organization of guidance programs varies as educators strive to meet the needs of students.

Philosophy of Guidance Programs

The diversity of student populations in today's schools makes it essential for guidance programs to operate from a philosophical base. Smith (1978) suggested that guidance programs should not overlook special populations when planning the directions of the program. " . . . methodology and technique must be developed that are relevant in terms of the needs of special populations and their relations to social systems" (p. 158).

The literature indicated that a program philosophy is necessary so that counselors are not left to assist students on the basis of their own personal philosophies or on trial and error. Aubrey (1970) indicated that "Programs of guidance and counseling centering on content or combinations of process and knowledge [should be] . . . organized and formulated with a view toward either the prevention of previously anticipated student problems or the enhancement of normal developmental processes" (p. 122).

Counselor/Student Ratio

Another area in the literature addressing guidance programs is the counselor/student ratio. Wrenn (1962) suggested in a report to the American Personnel and Guidance Association on Guidance in Schools that for every 300 students, one counselor should be assigned. Shertzer and Stone (1971) suggested that "one full-time counselor for 250-300 students has been one of the most obvious and well known external criteria of judging a good system" (p. 442). Finley and Shertzer (1967) conducted a study in a secondary school where Finley was school counselor to determine the counselor/student ratio. During the time of the study, Finley had 320 students from all grade levels (tenth, eleventh, and twelfth). One hundred and ninety-two of Finley's students completed a 20-item questionnaire. It was concluded by Finley that a counselor needs "approximately three and one half hours of contact time per student each academic year, or that by spending 60 percent of his time in contact, he could serve 225 students" (p. 38).

Autonomy of Counselors

While it is true that the organization of guidance programs should involve the school personnel, the question of decision-making within the guidance program is also important. Unfortunately, the review of the literature failed to reveal empirical studies related to this variable. The question, however, is important for this study because counselors are expected to meet the needs of all students. To meet such needs for "special populations" (e.g., females and minority students), counselors might need the authority to create or choose alternatives or additional services that have not been considered during the organization of the program. Thus, it is important to ask: "To what extent are counselors free to make decisions which affect their students?"

Suggested Career Models for Minority Students

A few researchers have designed career models that might be used by counselors to encourage minority students' enrollment in non-required mathematics and science courses and mathematics and science careers. A model designed by Smith (1978) was implemented at a three-day workshop that focused on increasing minority participation in the sciences. The objectives of the workshop, according to Smith: (a) "to provide opportunities for counselors to explore career opportunities in science and science related fields; and (b) to identify methods and techniques for motivating minorities to a level where they will seek opportunities in some of the employments. . . ." (p. 317).

Another model called "A Comprehensive Model for Intervention" was designed by Scott (1977). She suggested three conditions that must be met if minorities are to excel in employment in the science fields. These conditions are: (a) "the attainment of fundamental skills; (b) development of a long-range career plan and job availability; and (c) constant reinforcement, motivation and counseling regarding academic and professional prerequisites" (p. 13). Further, Scott indicated that the participation of counselors, teachers, and administrators in implementing her model is essential.

Suggested Career Models for Black Females

The literature on the organizational structure of guidance programs reveals, to date, no information regarding career programs or services that would increase the enrollment of black students (specifically black females) in non-required mathematics and science courses. It does, however, reveal career models that counselors might use in guidance programs when assisting minority students. For example, White (1979) and Burlew (1977) designed career models specifically for black females. White's "action-oriented career exploration model," if implemented into school guidance programs, would help black females choose realistic career goals. Essentially, according to White, in order for the model to work effectively, counselors must expose females to successful role models and also provide the "best" personality fit between career women and the black female students.

A similar model designed by Burlew (1977) was identified as a non-traditional approach for career counseling black females. Burlew's objectives included:

> The exposure of black females to information about available career and educational opportunities (e.g., knowledge and exposure to employment, aspirations and expectancies); and the reassurance to young black females that they have the ability to both complete higher levels of education and to be successful in a variety of careers (Self Concept of Ability and Expectations). (p. 100)

Guidance and Counseling Practices

Within the last 20 years, the majority of the research related to the role of school counselors has focused on how principals, teachers, students, parents, and counselors differentially perceive the role of counselors (Deitz, 1972; Evariff, 1961; Hart, 1970; Kaftan, 1967; Lund, 1962; Maser, 1971; McCandless & Pope, 1975; Shumake, 1964). Some studies have focused on the activities counselors actually perform and the activities counselors think that they should perform. The findings from these few studies suggest that assisting students in educational and vocational/occupational planning and personal adjustment are among the functions counselors actually perform (Hertzog, 1962).

Wrenn (1972) in a study of secondary school counselors asked participants to list the activities that they were presently performing and the activities that they felt should remain as functions of future guidance programs. All of the counselors felt that counseling students in educational and vocational planning and personal adjustment should remain as functions in guidance programs.

Perrone and Roth (1969), using a modified version of an instrument designed by Tennsyson (1968), conducted a study of school counselors and teacher counselors to determine how they perceived their actual and ideal roles and then compared those roles with a counselor role "model based on a consensus of Wisconsin counselor-educators" (p. 7). The authors reported that counselors actually spend more time assisting students in "individual" (personal) counseling than in assisting students in occupational and educational planning. Counselors and teacher-counselors spend about the same amount of time assisting students in orientation, appraisal, and follow-up activities. Counselors indicated that, ideally, less time should be spent in occupational and educational planning, and more time in group activities and follow-up studies. The counselor educator model contained activities similar to those that the counselors perceived as part of the ideal role of school counselors.

From these studies related to counseling and guidance practices, it appears that counselors are performing functions that are helpful to the educational and personal growth of students. What these studies failed to point out is the amount of time to which counselors devote to these functions. For this study, because of the underrepresentation of black females in mathematics and science careers, it is important to know the degree to which counselors assist black females in educational planning (e.g., course and program selection); and vocational/occupational planning (e.g., college and job information).

Summary

Together, from these limited sources it appears that (a) genererally, most counselors view traditional careers as appropriate for female and minority students; (b) assisting students in educational and vocational/occupational planning, and personal and social adjustments are among the functions that counselors perform and think that they should perform; and (c) generally, guidance programs are organized to accommodate the students enrolled in the schools.

The search failed to report on findings related specifically to: (a) the demographic and counseling practices of counselors as related to black females' enrollment in non-required mathematics and science courses; and (b) the organization of guidance programs as related to black females' enrollment in non-required mathematics and science courses. Therefore, research to investigate these areas seemed appropriate.

CHAPTER III

METHODOLOGY

The method and procedures used in conducting the study are discussed in this chapter in the following order: (a) the sample; (b) the design; (c) variables; (d) instrumentation; (e) procedures for data collection; and (f) procedures for analysis of data.

Sample

The sample for this study was 125 secondary school counselors and guidance directors in 46 schools located in 10 states throughout the United States. The participants ranged in age from 26-66 years. The number of years in their present position ranged from 1-28 years. Since this study was part of a larger study conducted by the Wisconsin Research and Development Center for Individualized Schooling, the selection of schools was made by the project director. Three types of schools were selected (predominantly black, predominantly white, and desegregated). The number of counselors from each type of school is shown in Table 3.1.

The 125 counselors who are in the sample represent 79 percent of the counselors who were originally sent questionnaires. Of the 157

Table 3.1

Selected Demographic Characteristics of Sample High Schools
Characteristics of Sample by School Size and Type

Number of Counselors in Sample	Number of Counselors in School	Number of Students in School	State
Predominantly Black (Schools with 70 Percent or More Black Students)			
3	7	1,623	CA
2	8	2,704	CA
6	6	1,848	CA
1	1	545	CA
3	4	1,063	LA
3	3	1,178	LA
2	2	868	LA
1	1	540	MS
2	2	342	MS
2	2	676	NC
3	3	1,096	OH
2	3	676	OH
1	1	756	TN
1	2	601	TN
2	2.5	655	VA
2	2	697	VA
36 Counselors			
Predominantly White (Schools with 30 Percent or Fewer Black Students)			
5	5	2,175	LA
1	1	617	LA
2	4	1,851	LA
3	3	1,397	LA
3	3	1,515	NC
2	5	1,865	NC
2	2	1,042	NC
5	5	1,355	OH
5	5	1,731	OH
3	3	1,266	SC
1	1	325	TN

(continued)

Table 3.1

Selected Demographic Characteristics of Sample High Schools Characteristics of Sample by School Size and Type

(continued)

Number of Counselors in Sample	Number of Counselors in School	Number of Students in School	State
2	2	782	TN
2	2	770	TN
5	7	2,768	TN
3	3	1,172	VA
5	8	1,338	VA
4	8	1,677	VA
5	6	1,373	VA
58 Counselors			
Desegregated (Schools with 45-55 Percent Black Students)			
2	2	697	GA
2	2	727	GA
2	2	1,127	LA
2	2	765	LA
3	4	1,262	LA
4	5	1,609	NC
2	2.5	905	NC
2	2.5	909	NC
2	2.5	940	SC
4	4	1,262	TN
1	1	312	TX
5	7	2,158	VA
31 Counselors			

questionnaires sent to counselor and guidance directors, 132 (84 percent) were returned. Seven of these were inappropriate for the purpose of the study because respondents were not full-time secondary school counselors or because respondents failed to respond to most of the questions. The remaining 125 (79 percent) questionnaires were used for descriptive information about the sample. However, not all of these could be used to answer the research questions. Twenty-five of the respondents did not answer the question related to enrollment of black females in non-required mathematics courses; and 26 did not answer the question related to enrollment of black females in non-required science courses. Thus, the descriptive statistics herein describe the total usable sample (125), but the results of the statistical tests (chi square and forward stepwise regression) are based only on the responses from those counselors who answered the questions related to the dependent variables, "enrollment of black females in non-required mathematics courses" (N=100), and "enrollment of black females in non-required science courses" (N=99).

Design

The design for this study was _ex post facto_ with field survey methodology. According to Kerlinger (1973), "Survey research studies large and small populations (or universes) by selecting and studying samples chosen from the population to discover the relative incidence, distribution, and interrelations of sociological and psychological variables" (p. 410). This design allowed the investigator to analyze information from counselors and guidance directors from 46 secondary schools.

Data collected from the counselors and guidance directors were used to answer the questions stated in Chapter I. Again, they are:

1. Does the enrollment of black females in non-required mathematics and science courses vary systematically according to the demographic characteristics of school counselors?
2. Does the enrollment of black females in non-required mathematics and science courses vary systematically according to the characteristics of guidance programs?
3. Does the enrollment of black females in non-required mathematics and science courses vary systematically according to counseling and guidance practices?

Instrumentation

A questionnaire (Appendix A) was constructed to obtain information on the questions of both this study and the project in general. This questionnaire, consisting of five sections, was based on careful study of several instruments:

(a) Educational Opportunities Survey used in the Equality of Education Opportunity Report by James Coleman (1966) to assess opinions from secondary school counselors and teachers regarding aspirations of students.

(b) Counselor Questionnaire used in the National Longitudinal Study of the High School Class of 1972. The instrument was prepared for the United States Office of Education by the Educational Testing Service (Spring 1972) to obtain opinions of counselors toward their guidance programs in secondary schools.

(c) Counselor Interview Form constructed by Scott (1977) to determine the current counseling practices of counselors in secondary schools.

Section One of the questionnaire consists of items addressing the Characteristics of Counseling and Guidance programs; Section Two consists of items addressing the Characteristics of Students; Section Three consists of items addressing the Counseling and Guidance Practices of school counselors and guidance directors; Section Four consists of items addressing the degree to which counselors and guidance directors were satisfied with their roles and the amount of time they spent in various meetings; and Section Five consists of Demographic Information about counselors and guidance directors.

A pilot study was conducted to examine the face validity of the instrument. Nine secondary school counselors and one guidance director, from three states (Nevada, Texas, and Wisconsin), participated in the study. The participants (7 females and 3 males) ranged in age from 30-57 years with number of years in present position ranging from 2-16 years. Participants were instructed to comment on the clarity of items and to estimate the amount of time it took them to complete the questionnaire.

The amount of time ranged from 35 minutes to 3 hours. Several participants reported that some of the questions (11-15) could not be answered accurately without checking each student's record. Some participants indicated that the questionnaire should not request information about non-black females or males. The majority of the participants answered the three open-ended questions with the same general statement.

Based on these findings, the following revisions were made: (a) several questions were reworded to obtain approximate information from the respondents (e.g., words about and generally were used to introduce questions that had requested exact numbers or percentages); (b) references to males were deleted from the questionnaire. Thus, respondents were asked only about females assigned to them (i.e., black females, white females, and other females); and (c) only one open-ended question was used.

Listed below are the independent and dependent variables that were analyzed in the study and their location in the questionnaire. A complete copy of the questionnaire is found in Appendix A.

I. Independent Variables*	Section	Item Number
a. Organization of guidance programs	I	1a-f

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*Items 2, 4b, 5a,b,j, and k, 7, 8, 9, 11c-f, 12, 16, 17, 19, 20, and 28 were omitted from the analyses.

Independent Variables (continued)	Section	Item Number
b. Philosophy of guidance programs (7 variables)	I	3a-h
c. Counselor/student ratio	I	5d-g and i
d. Amount of involvement counselors report in specific counseling and guidance services (9 variables)	III	6a-i
e. Amount of time counselors spend with students in educational and career planning, personal/social adjustment, and other job related activities (4 variables)	III	13a-d
f. Prerequisites considered most important when enrolling students in non-required math and science courses (7 variables)	III	14a-g (math)
g. Prerequisites considered most important when enrolling students in non-required math and science courses (7 variables)	III	14a-g (science)
h. How often students request assistance about taking non-required mathematics and science courses	III	15a
i. Special efforts used to encourage blacks to enroll in non-required mathematics and science courses	III	18
j. Ethnic background	V	21
k. Sex	V	22
l. Age	V	23
m. Educational background (4 variables)	V	24, 25, 27a-b
n. Professional experience (4 variables)	V	28, 29, 30, and 31

II. Dependent Variables	Section	Item Number
a. Enrollment of black females in non-required mathematics courses	II	10a
b. Enrollment of black females in non-required science courses	II	10b

Definition of and Rationale for the Variables

The rationale for using the various scales and codes and the application of each is discussed in this section. The type of code (i.e., 4- or 5-point scale, reasons--code-open ended questions, dichotomous code, trichotomous code, listing code, bracket code, or field code) used to obtain answers for each variable was decided upon after consulting with authorities in the field of survey research, vocational/career development, and minority research. The experts' suggestions enabled this investigator to choose the codes that counselors could understand and respond to most readily.

The independent variables were related to three categories: (a) demographic characteristics of counselors; (b) characteristics of guidance programs; and (c) counseling and guidance practices. The dependent variables came from the section on characteristics of students. In several cases it was necessary to group the percentages or numbers into larger categories. Usually this was done so that the frequencies were approximately equally distributed in the collapsed groups.

1. Demographic characteristics of counselors:

(a) Sex--respondent indicated by a check whether she or he was male or female. For data analysis male was scored 1 and female was scored 2.

(b) Age--respondent recorded his or her age in years as of last birthday. For statistical analysis, the age of the respondent was grouped into 3 categories (26-39, 40-49, and 50-66 years).

(c) Ethnic background--respondent checked the designation that best described him or her (i.e., American Indian/Native American; Black, Afro-American, Negro; Chicano/Mexican American, Hispanic, Oriental, Asian American; Puerto Rican; White, Caucasian; and other. For statistical analysis, these designations were assigned to categories numbered 1-7.

(d) Educational background--Four variables were used to measure the "educational background" of the respondents:

1. Highest degree earned--respondent recorded his or her highest earned degree. For statistical analysis, the degrees were grouped into 2 categories (masters and below; and masters+ and above).
2. Undergraduate major--respondent recorded his or her undergraduate major. For statistical analysis, the majors were grouped into 4 categories (Natural Science and Business,

Social Science, Humanities, and Education).

3. Number of college credits in counseling minority students--respondent recorded the number of credits. For statistical analysis, the number of credits was grouped into 2 categories (0-3 and 4-39 credits).

4. Number of college credits in vocational/career development--respondent recorded the number of credits. For statistical analysis, the number of credits was grouped into 2 categories (0-3 and 4-50 credits).

(e) Professional experience--three variables were used to measure the "professional experience" of the respondent.

1. Number of years in present position--respondent recorded the number of years she or he had been employed in present position. For statistical analysis, the numbers of years were grouped into 3 categories (1-2, 3-9, and 10-28 years).

2. Number of years of full-time counseling experience--respondent recorded the number of years of counseling experience. For statistical analysis, the numbers of years were grouped into three categories (1-7, 8-13, and 14-26 years).

3. Number of years of teaching experience--respondent

recorded the number of years of teaching experience. For statistical analysis, the numbers of years were grouped into 3 categories (2-10, 11-19, and 20-23 years).

2. Characteristics of guidance programs:

   (a) Organization of guidance services--respondent indicated by a check the method by which students were assigned to counselors in his or her school. For statistical analysis, only four of the six methods were used. These methods were grouped into three categories: "alphabetically and randomly," "single class," and "entering class." The methods "specialists" and "other" were deleted because comments on these methods suggested that the respondents did not interpret the methods properly.

   (b) Philosophy of guidance programs--respondent indicated by a check the importance of eight objectives in the counseling and guidance program in his or her school. For statistical analysis, each objective was treated as a separate variable and measured on a 4-point scale ranging from 1 to 4 ("very important," "unimportant," "important," and "very important."

   (c) Counselor/student ratio--respondent recorded the number of students assigned to him or her. For statistical analysis, the numbers of students assigned were grouped into three categories: 0-275, 276-400, and 401+.

(d) Autonomy of counselors--respondent indicated by a check the degree to which she or he was involved with six decisions related to the academic development of students. For statistical analysis, each decision was treated as a separate variable and measured on a 4-point scale ("no involvement," "little involvement," "some involvement," and "substantial involvement").

3. Counseling and Guidance practices:

(a) The amount of involvement counselors report in specific counseling and guidance activities--respondent recorded the amount of time by a check to indicate the amount of time she or he spent in 9 activities. For statistical analysis, each activity was treated as a separate variable and measured on a 4-point scale ("none of my time," "a little of my time," "some of my time," and "a lot of my time").

(b) The amount of time counselors spend with students in educational and career planning, personal/social adjustments and other job related activities--respondent recorded the percentage of time (based on 100 percent) she or he spent in each counseling practice (i.e., educational planning, career planning, personal/social adjustment, and other related activities). For statistical analysis, the actual percentages (e.g., 20 percent) were used, instead of categories reflecting a range of percentages (e.g., 0-20 percent).

(c) Prerequisites considered most important when enrolling students in non-required mathematics and science courses--respondent indicated by a check the prerequisites considered most important. For statistical analysis, a check was scored 2 and a blank scored 1.

(d) How often students (black females) request assistance in making decisions about taking non-required mathematics and science courses--respondent indicated by a check the degree to which black females request assistance. For statistical analysis, a 4-point scale ranging from 1-4 ("never," "sometimes," "frequently," and "very often") was used.

(e) Special efforts used to encourage black females to enroll in non-required mathematics and science courses--respondent was asked to record special efforts used in his or her school. For statistical analysis, the investigator developed a 4-point scale to measure the responses to the open-ended question. The responses ranged on a scale from 1-4 ("no efforts," "routine efforts," "routine and special efforts," and "special efforts").

The following characteristics served as dependent variables in the statistical analysis of the data:

(a) Enrollment of black females in non-required mathematics courses--respondent was asked to record the percentage of black females enrolled in mathematics. Based on the responses, the percentages were grouped into 3 categories for statistical analysis: Low enrollment=0-10 percent; median enrollment=11-30 percent; and high enrollment=31-100 percent. Frequencies were approximately equally distributed in the three categories. The mean score of 27.7 percent was in the "medium" enrollment category.

(b) Enrollment of black females in non-required science courses--respondent was asked to record the percentage of black females enrolled in science. Based on the responses, the 3 categories used for statistical analysis (low, medium, and high) were defined by slightly different percentages than those in the mathematics variable. In this case, low enrollment=0-10 percent; medium enrollment=11-25 percent; and high enrollment=26-100 percent. The mean score of 22.8 percent was in the "medium" category.

Procedures for Data Collection

Questionnaires were mailed to designated survey coordinators in each of the 46 schools. Each questionnaire was sent in an envelope labeled Science Teacher, Math Teacher, or Counselor/Guidance Director. The coordinator, with specific instructions from the project director, was responsible for the administration and collection of all questionnaires. A cover letter was attached to the counselor questionnaire (Appendix A) which explained the purpose of the study. In order to assure confidentiality, participants were asked to replace the questionnaire in the envelope and seal it before returning it to the coordinator. The coordinator mailed the questionnaires to the project director in the Wisconsin Research and Development Center for Individualized Schooling.* The project director then gave this investigator access to the Counselor Questionnaires. Because of the many limitations of a mail questionnaire (e.g., low return), several procedures were used to ensure a positive return: (a) the cover letter attached to the questionnaire was typed on the Research and Development Center's letterhead; (b) the counselor questionnaire was designed to be completed within 30 to 40 minutes; (c) the project director informed each designated school coordinator that he or she would receive an honorarium upon the return of all questionnaires; and (d) the cover letter was signed by the project director instead of this investigator.

Data Analysis and Statistical Procedures

This research was directed toward answering the research questions stated in Chapter I. Not all of the questionnaire items were used for analysis. Questions that were merely explanatory in nature and questions relevant only for analysis of the total project were omitted (see page 32). Several procedures were used to examine the data:

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*Project on Minority Female Involvement in High School Science and Mathematics. Funded by NIE under Grant No.: NIE-G-79-0110.

First, the questionnaires were coded for keypunching. Each question that did not have numerical responses (i.e., a code of "very unimportant" to "very important") was assigned a numerical code. In this way the questionnaires were keypunched from the original forms.

Second, the questionnaires were keypunched and verified in the Computer Center at the Research and Development Center for Individualized Schooling.

Third, the SPSS Computer program (Statistical Package for Social Science) was used to analyze the questionnaire data.

Fourth, parametric and non-parametric statistical measures were used in answering the three research questions:

(a) Measures of central tendency (i.e., mean) and variability (i.e., standard deviation and range) were used to examine quantitative variables; and percentages and frequencies were used to report non-quantitative variables.

(b) Chi square and forward stepwise multiple regression analysis were used to determine what counseling and guidance factors varied systemically with the enrollment of black female students in non-required mathematics and science courses.

The level of significance for this research is .05 percent. The investigator used this level for the purpose of reporting the analyses that follow.

CHAPTER IV

RESULTS AND DISCUSSION

The results of the study are reported and discussed in this chapter. Descriptive statistics on the 45 variables examined are reported in the first section. The results of two statistical procedures used to answer the research questions are presented in section two. Chi square analyses were used to examine the relationships of the enrollment of black females in non-required mathematics and science courses to 10 demographic characteristics of counselors (Questions 21, 22, 23, 24, 26, 27, 30, and 31), two characteristics of guidance program variables (Questions 1 and 5) and two counseling and guidance practice variables (Questions 15 and 18). Forward stepwise multiple regression analyses were used to examine relationships among two variables relative to guidance programs (Questions 3 and 5c,d,e,f, and i) and three variables relative to counseling and guidance practices (Questions 6, 13, 14, 15, and 18) with the enrollment of black females in non-required mathematics and science courses as the dependent variables.

Descriptive Summary

In this section descriptive statistics for all variables with quantitative and qualitative responses are reported.

Summary of Quantitative Responses

The descriptive statistics for all variables with quantitative responses for the total sample (N=125) of counselors are given in Table 4.1. For each variable, the mean, standard deviation, and range is reported. The variables, "age," "number of years employed in present position," "number of years of full-time counseling experience," "number of years of teaching experience," and "counselor/student ratio" were reported by respondents in actual numbers. The "amount of time spent in educational and career planning, personal and/or social adjustment and other job related activities," "enrollment of black female students in non-required mathematics courses," and "enrollment of black female students in non-required science courses" were reported by respondents in percentages.

Summary of Qualitative Responses

The qualitative responses include seven variables relative to the demographic characteristics of counselors and one variable relative to the characteristics of guidance programs. The category "Missing Data" in each table refers to information not supplied by the respondents. Distribution frequencies for the demographic characteristics of counselors are reported in Tables 4.2-4.7. One characteristic of guidance variable is reported in Table 4.8.

Table 4.1

Mean, Standard Deviation, and Range of Scores
for 38 of the Study Variables

Variable	Mean	Standard Deviation	Range
Demographic			
1. Age	45.6	9.7	26-66
2. Years employed in present position	7.9	6.5	1-28
3. Years of counseling experience	11.1	6.1	1-26
4. Years of teaching experience	15.8	8.6	2-33
5. Number of college credits in counseling minority students	3.1	6.9	0-39
6. Number of college credits in vocational/career development	10.1	8.3	4-50
Philosophy of Guidance Program Variables			
7. Providing individual and group data about students for school wide program planning and development	3.4	.63	1-4*
8. Reducing and eliminating maladaptive behavior of students (e.g., truancy, classroom misconduct, etc.)	3.5	.58	2-4*
9. Providing equal opportunity for all students	3.8	.44	2-4*
10. Providing remedial services for students with special educational needs	3.6	.56	2-4*

(continued)

Table 4.1

Mean, Standard Deviation, and Range of Scores
for 38 of the Study Variables

(continued)

Variable	Mean	Standard Deviation	Range
11. Providing career development activities for all students	3.7	.55	1-4*
12. Promoting value clarification and self-awareness for all students	3.5	.64	1-4*
13. Promoting problem-solving and decision making skills for all students	3.5	.68	1-4*
14. Working with parents and community agencies to meet students' needs	3.6	.53	2-4*
Counselor/Student Ratio			
15. Number of students currently assigned for counseling and guidance	372.91	145.02	60-788
Autonomy of Counselors Variables			
16. The establishment of student conduct rules in the school.	2.0	.87	1-4*
17. The establishment of the criteria for students taking nonrequired courses in mathematics and science	2.3	1.1	1-4*
18. The transferring of students to programs or courses that will better match their abilities and interests	3.6	.71	1-4*

(continued)

Table 4.1

Mean, Standard Deviation, and Range of Scores for 38 of the Study Variables

(continued)

Variable	Mean	Standard Deviation	Range
19. The developing of programs that will provide assistance to special population groups (e.g., for females)	2.4	1.0	1-4*
20. The establishing of the criteria for cut-off scores for placement of students in non-required science and mathematics courses	1.9	1.0	1-4*
21. The development of procedures for reporting student progress to parents	2.6	1.1	1-4*
The Amount of Involvement Counselors Report in Specific Counseling and Guidance Activity Variables			
22. Assisting students in selecting their high school courses	3.8	.46	2-4*
23. Assisting students in selecting a program of study (e.g., college prep., general, etc.)	3.6	.51	2-4*
24. Counseling students in developing their special abilities	3.2	.72	1-4*
25. Organizing field trips for students	1.7	.69	1-4*
26. Assisting students with career development (e.g., occupational choice, college choice, post high school work, etc.)	3.5	.61	2-4*

(continued)

Table 4.1

Mean, Standard Deviation, and Range of Scores for 38 of the Study Variables

(continued)

Variable	Mean	Standard Deviation	Range
27. Providing career day programs	2.4	.95	1-4*
28. Providing audio-visual aids as a means of acquainting students with careers	2.2	.83	1-4*
29. Recommending readings (e.g., in the library) about various careers	2.5	.83	1-4*
30. Meeting with teachers regarding specific students	3.2	.58	2-3*
Amount of Time Spent in Educational and Career Planning, Personal and/or Social Adjustments, and Other Job Related Activities			
31. Assisting students in high school educational planning	41.47	17.24	5-95
32. Assisting students in career planning	29.90	13.91	4-80
33. Assisting students with personal and/or social adjustments	22.13	14.46	1-75
34. Other	11.90	11.72	0-60
35. How often students requested assistance about taking non-required mathematics and science courses	2.7	.78	2-4*

(continued)

Table 4.1

Mean, Standard Deviation, and Range of Scores
for 38 of the Study Variables

(continued)

Variable	Mean	Standard Deviation	Range
36. Special efforts used to encourage black females to enroll in non-required mathematics and science courses	2.2	1.09	1-4
Dependent Variables			
37. Percentage of black females enrolled in non-required mathematics courses	27.69	23.96	0-100
38. Percentage of black females enrolled in non-required science courses	22.79	20.99	0-100

*Coded according to Likert scale: 1=Low and 4=High

The ethnic background of counselors is reported in Table 4.2. Most of the counselors were either black or white Americans.

Table 4.2

Distribution of Ethnic Background for the Total Sample

Variable	Number of Counselors	% of Total Sample
Black American	43	34.4
Native American	1	.8
Hispanic American	3	2.4
White American	70	56.0
Other	1	.8
Missing Data	7	5.6
Total	125	100.0%

The sexual composition of the counselor sample is presented in Table 4.3. The ratio of females to males is about 5 to 3 for the sample.

The highest degree earned by the respondents is reported in Table 4.4. An examination of these data suggests that most school counselors possess a master's degree.

The number of counselors that had completed a master's degree in counseling and guidance is reported in Table 4.5. Over three-fourths of the counselors had completed the degree.

Table 4.3

Distribution of Sex for Total Sample

Variable	Number of Counselors	% of Total Sample
Male	46	36.8
Female	74	59.2
Missing Data	5	4.0
Total	125	100.0%

Table 4.4

Distribution of Highest Earned Degree of Total Sample

Variable	Number of Counselors	% of Total Sample
Bachelors	3	2.4
Masters	82	65.6
Masters+	24	19.2
Doctoral	3	2.4
Other	7	5.6
Missing Data	6	4.8
Total	125	100.0%

Table 4.5

Distribution of Masters Degree for Total Sample

Variable	Number of Counselors	% of Total Sample
Yes	101	80.8
No	15	12.0
Missing Data	9	7.2
Total	125	100.0%

The undergraduate major of the counselors is presented in Table 4.6. The percentage of counselors with degrees in the Humanities and Education areas is approximately equal. The percentage of counselors with degrees in the Social Science area is slightly less than those in Education and Humanities. None of the counselors reported an undergraduate major in mathematics.

The respondents' job titles are reported in Table 4.7. About three-fourths of the respondents were school counselors. Only 16 percent of the respondents held jobs with the title of Guidance Director.

The various ways students were assigned to counselors are reported in Table 4.8. The choices were: (a) alphabetically; (b) randomly; (c) single class (counselor is assigned to same grade level year after year); (d) entering class (i.e., counselor is assigned to an entering class and remains with that class until it graduates);

Table 4.6

Distribution of Undergraduate Major

Variable	Number of Counselors	% of Total Sample
Business	13	10.4
Education	30	24.0
Humanities	32	25.6
Natural Science	12	9.6
Social Science	24	20.0
Missing Data	13	10.4
Total	125	100.0%

Table 4.7

Distribution of Position in School of Total Sample

Variable	Number of Counselors	% of Total Sample
School Counselor	95	76.0
Guidance Director	20	16.0
Other	5	4.0
Missing Data	5	4.0
Total	125	100.0%

(e) specialists (i.e., counselors have expertise in certain areas); and (f) other. The majority of the counselors reported that students were assigned to counselors alphabetically.

Table 4.8

Distribution of Organization of Guidance Programs for Total Sample

Variable	Number of Counselors	% of Total Sample
Alphabetically	54	43.2
Randomly	2	1.6
Single Class	21	16.8
Entering Class	29	23.2
Specialist	7	5.6
Other	11	8.8
Missing Data	1	.8
Total	125	100.0%

Discussion of Descriptive Summaries

This section of the discussion will focus on selected summary statistics in order to provide a general overview of the sample.

Race. The data collected revealed that non-black respondents were in the majority of this study. Of the 125 respondents, 75 (60.0 percent) were non-black and 43 (34.4 percent) were black

(Table 4.2). Few studies (Flakes, 1973; Persons, 1972) have focused on the race of counselors. The ratio of black and white counselors was not mentioned by Smith (1975) when he referred to Flakes' (1973) study. One interesting finding, according to Smith, was that both black and white counselors have a tendency to advise blacks (in general) away from science related areas of study (p. 2).

In the selection of schools for this study, no attempt was made to control for an even racial composition of counselors. However, efforts were made by the project director to control for the racial composition of schools. Thus, three categories of schools were selected: (a) predominantly black; (b) predominantly white; and (c) desegregated.

Sex. About 60 percent of the respondents in this study were females. The ratio of females to males is about 5 to 3 for the sample.

Age. The respondents ranged in age from 26-66 years. The mean age was 46 years with a standard deviation of 9.7 years (Table 4.1). No age figures were reported in the studies by Donahue and Costar (1977) and Engelhard, Jones, and Stiggins (1976). However, neither study suggested that age made a statistically significant difference in the way counselors advise females about career choices.

Educational background. Four variables were used to explain the educational background of the respondents: undergraduate major, highest degree earned, number of credits in vocational/career development, and number of credits in counseling minority students. The majority of respondents reported undergraduate majors in the areas of

Humanities, Social Science, and Education. At the graduate level, a Masters degree was the highest degree earned (Tables 4.4 and 4.6). Referring to the focus of this study, one interesting finding is that none of the respondents (N=125) reported mathematics as an undergraduate major.

Professional experience. Three variables were used to measure the professional experience of the respondents: number of years employed in present position, number of years of full-time counseling experience, and number of years of teaching experience. The mean for each variable (7.9, 11.1, and 15.8, respectively) indicated that most respondents were not newcomers to the field of counseling (Table 4.1).

Philosophy of guidance programs. Seven variables were used to measure the philosophy of guidance programs: (a) providing individual and group data; (b) reducing and eliminating maladaptive behavior of students; (c) providing equal opportunity for all students; (d) providing remedial services for all students; (e) providing career development; (f) promoting value clarification, (g) promoting problem-solving and decision-making skills; and (h) working with parents and community. Each respondent rated the importance of these variables in their programs on a scale from 1 (very unimportant) to 4 (very important). All of the variables had a mean score of 3.0 or above on the 4-point scale. It appears that the school counselors thought that all of the objectives were important to the counseling and guidance programs in their schools.

Autonomy of counselors. Six variables were used to measure the autonomy of counselors: (a) autonomy in establishing student conduct rules; (b) establishing the criteria for student taking courses in non-required mathematics and science courses; (c) transferring of students to programs or courses to match their abilities; (d) developing programs for special populations (i.e., for females); (e) establishing criteria for cut-off scores for placement of students in non-required mathematics and science courses; and (f) developing of procedures for reporting student progress to parents. Respondents rated their involvement with these activities on a scale ranging from 1 ("no involvement") to 4 ("substantial involvement"). The variable, "transferring students to programs or courses to match their abilities," had the highest mean score of 3.6 on the 4-point scale. The majority of the variables had mean scores between 2.0 and 2.6. It appears that counselors thought they were "somewhat" involved with academic decision-making related to students and "not" involved with policy decision-making related to program planning. The literature review did not reveal empirical studies related to the autonomy of counselors. However, these variables appear important because school counselors are expected to meet the needs of all students. Thus, they need the flexibility of making decisions (i.e., providing additional services to special populations) regarding the students assigned to them.

In general, no unusual patterns, trends, or characteristics were revealed in the description of the sample. As a result, there are no factors that would necessitate caution in interpreting the analyses which follow.

Demographic Characteristics of Counselors and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

This section of the analysis addresses the first research question:

> Does the enrollment of black female students in non-required mathematics and science courses vary systemically according to the demographic characteristics of counselors?

This research question focused on the relationship of the two dependent variables, "enrollment of black female students in non-required mathematics courses," and "enrollment of black female students in non-required science courses," to the following independent variables (demographic characteristics of counselors): (a) ethnic background; (b) sex; (c) age; (d) educational background; and (e) professional experience.

Results

Chi square analysis was used to compare the relationship within the independent variables. Data for each dependent variable were grouped into categories with approximately equal N's. In order to meet the assumptions of the chi square test, two criteria were employed for grouping the responses. One consisted of a content analysis of response to each variable to identify similarities along a continuum that could be readily grouped. The second criterion addressed the actual group size. Where natural grouping did not occur, the responses were grouped into categories on the basis of cell size.

For statistical analysis, it was also necessary to group into three categories the responses to the dependent variables. The criteria employed for grouping the independent variables were also used in grouping the dependent variables. Particularly important for the enrollment percentages reported by the respondents was the criterion of group size.

Non-required mathematics courses	%	N
Low enrollment of black females	0-10	33
Medium enrollment of black females	11-30	36
High enrollment of black females	31-100	31
		N=100

Non-required science courses	%	N
Low enrollment of black females	0-10	39
Medium enrollment of black females	11-25	28
High enrollment of black females	26-100	32
		N=99

The results of chi square analyses for 10 demographic variables of school counselors as related to the enrollment of black females in non-required mathematics and science courses are reported in Table 4.9. The first three variables were: (a) ethnic background; (b) sex; and (c) age. The next four variables measured the educational background of the respondents: (a) highest earned college degree; (b)

Table 4.9

Demographic Characteristics of Counselors and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Independent Variables	Dependent Variable			Dependent Variable		
	Enrollment in Non-required Mathematics Courses			Enrollment in Non-required Science Courses		
	df	X^2	Probability Level	df	X^2	Probability Level
1. Ethnic background	2	1.48	.4777	2	1.94	.3783
2. Sex	2	.95	.6231	2	2.31	.3153
3. Age	4	.40	.9822	4	1.83	.7577
Educational background variables						
4. Highest earned college degree	2	2.05	.3590	2	1.98	.3710
5. Undergraduate major	6	12.45	.0527	6	10.44	.1074
6. Number of college credits in counseling minority students	2	2.53	.2818	2	5.24	.0727
7. Number of college credits in vocational/career development	2	.68	.7130	2	.02	.9899
Professional experience variables						
8. Years employed in present position	4	1.94	.7470	4	2.54	.6379
9. Years of counseling experience	4	5.26	.2614	4	9.24	.0553
10. Years of teaching experience	4	1.42	.8414	4	1.24	.8717

undergraduate major; (c) number of college credits in counseling minority students; and (d) number of college credits in vocational/career development. The last three variables measured the professional experience of the counselors: (a) number of years employed in present position; (b) number of years of counseling experience; and (c) number of years of teaching experience.

None of the chi square values in Table 4.9 are significant at an alpha level of .05. Thus, the data suggest a lack of significant relationships between the demographic characteristics of counselors and the enrollment of black females in non-required mathematics and science courses. For descriptive purposes, Tables 4.10-4.19 are included. The observed frequencies and row, column, and total percentages are presented in the contingency tables.

Ethnic background. The analysis of the ethnic background of counselors and the enrollment of black females in non-required mathematics and science courses are shown in Table 4.10. For statistical analysis, the data were grouped into two categories. The "black" category included only black, and the "non-black" category included "white American," "native American," "hispanic American," and "other." The relationship between ethnic background of counselors and enrollment was not statistically significant.

Sex. The analysis of sex of counselors and the enrollment of black females in non-required mathematics and science courses is reported in Table 4.11. There was no significant relationship between the sex of counselors and black female student enrollment in

Table 4.10

Ethnic Background of Counselors and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Mathematics		Ethnic Background		
		Black	Non-Black	Total
0-10% Low Enrollment	F	9	21	30
	r	30.0	70.0	
	c	24.3	36.2	
	T	9.5	22.1	31.6
11-30% Medium Enrollment	F	15	20	35
	r	42.9	57.1	
	c	40.5	34.5	
	T	15.8	21.1	36.8
31-100% High Enrollment	F	13	17	30
	r	43.3	56.7	
	c	35.1	29.3	
	T	13.7	17.9	31.6
Column Total		37	58	95
		38.9	61.1	100.0
	X^2=1.48	2df	Probability Level=.4777	N.S.

Science		Ethnic Background		
		Black	Non-Black	Total
0-10% Low Enrollment	F	11	26	37
	r	29.7	70.3	
	c	30.6	44.8	
	T	11.7	27.7	39.4
11-25% Medium Enrollment	F	11	15	26
	r	42.3	57.7	
	c	30.6	25.9	
	T	11.7	16.0	27.7
26-100% High Enrollment	F	14	17	31
	r	45.2	54.8	
	c	38.9	29.3	
	T	14.9	18.1	33.0
Column Total		36	58	94
		38.3	61.7	100.0
	X^2=1.94	2df	Probability Level=.3783	N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

Table 4.11

Sex of Counselors and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Mathematics		Sex		
		Male	Female	Total
0-10% Low Enrollment	F	14	17	31
	r	45.2	54.8	
	c	37.8	28.8	
	T	14.6	17.7	32.3
11-30% Medium Enrollment	F	13	22	35
	r	37.1	62.9	
	c	35.1	37.3	
	T	13.5	22.9	36.5
31-100% High Enrollment	F	10	20	30
	r	33.3	66.7	
	c	27.0	33.9	
	T	10.4	20.8	31.3
Column Total		37	59	96
		38.5	61.5	100.0
	X^2=.95	2df	Probability Level=.6231	N.S.

Science		Sex		
		Male	Female	Total
0-10% Low Enrollment	F	16	21	37
	r	43.2	56.8	
	c	44.4	35.6	
	T	16.8	22.1	38.9
11-25% Medium Enrollment	F	7	20	27
	r	25.9	74.1	
	c	19.4	33.9	
	T	7.4	21.1	28.4
26-100% High Enrollment	F	13	18	31
	r	41.9	58.1	
	c	36.1	30.5	
	T	13.7	18.9	32.6
Column Total		36	59	95
		37.9	62.1	100.0
	X^2=2.31	2df	Probability Level=.3153	N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

non-required mathematics and science courses.

Age. The analysis of the age of counselors and the enrollment of black females in non-required mathematics and science courses is reported in Table 4.12. For statistical analysis, the ages were grouped into three categories: 26-39, 40-49, and 51-66 years. The relationship between the age of counselors and enrollment was not statistically significant.

Educational experience. The chi square analyses of the variables comprising educational experience and enrollment of black females in non-required mathematics and science courses are shown in Tables 4.13-4.16. The analysis of the variable, highest earned college degree, and enrollment of black females in non-required mathematics and science courses is reported in Table 4.13. For statistical analysis, the degrees of counselors were grouped into two categories: The "masters and below" category included "masters" and "bachelors" degrees. The "masters plus and above" category included "masters plus," "doctoral," and "other." The relationship between the highest degree earned and the enrollment of black females in mathematics and science was not statistically significant.

The analysis of the undergraduate major of counselors and enrollment of black females in non-required mathematics and science courses is reported in Table 4.14. As presented in Table 4.6, only 12 respondents reported a major in the Natural Sciences and 13 reported a major in Business. Because of the few responses in each area, for statistical analysis, these categories were combined in order to

Table 4.12

Age of Counselors and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Mathematics		Age			
		26-39	40-49	51-66	Total
	F	9	9	11	29
0-10%	r	31.0	31.0	37.9	
Low Enrollment	c	30.0	33.3	34.4	
	T	10.1	10.1	12.4	32.6
	F	12	9	12	33
11-30%	r	36.4	27.3	36.4	
Medium Enrollment	c	40.0	33.3	37.5	
	T	13.5	10.1	13.5	37.1
	F	9	9	9	27
31-100%	r	33.3	33.3	33.3	
High Enrollment	c	30.0	33.3	28.1	
	T	10.1	10.1	10.1	30.3
Column		30	27	32	89
Total		33.7	30.3	36.0	100.0

X^2=.40 4df Probability Level=.9822 N.S.

Science		Age			
		26-39	40-40	51-66	Total
	F	11	10	14	35
0-10%	r	31.4	28.6	40.0	
Low Enrollment	c	36.7	37.0	45.2	
	T	12.5	11.4	15.9	39.8
	F	7	9	9	25
11-25%	r	28.0	36.0	36.0	
Medium Enrollment	c	23.3	33.3	29.0	
	T	8.0	10.2	10.2	28.4
	F	12	8	8	28
26-100%	r	42.9	28.6	28.6	
High Enrollment	c	40.0	29.6	25.8	
	T	13.6	9.1	9.1	31.8
Column		30	27	31	88
Total		34.1	30.7	35.2	100.0

X^2=1.88 4df Probability Level=.7577 N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

Table 4.13

Highest Earned College Degree of Counselors and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Mathematics		College Degree		
		Masters and Below	Masters+and Above	Total
	F	19	11	30
0-10%	r	63.3	36.7	
Low Enrollment	c	27.9	40.7	
	T	20.0	11.6	31.6
	F	25	10	35
11-30%	r	71.4	28.6	
Medium Enrollment	c	36.8	37.0	
	T	26.3	10.5	36.8
	F	24	6	30
31-100%	r	80.0	20.0	
High Enrollment	c	35.3	22.2	
	T	25.3	6.3	31.6
Column		68	27	95
Total		71.6	28.4	100.0
	X^2=2.05	2df	Probability Level=.3590	N.S.

Science		College Degree		
		Masters and Below	Masters+and Above	Total
	F	24	12	36
0-10%	r	67.7	33.3	
Low Enrollment	c	35.8	44.4	
	T	25.5	12.8	38.3
	F	18	9	27
11-25%	r	66.7	33.3	
Medium Enrollment	c	26.9	33.3	
	T	19.1	9.6	28.7
	F	25	6	31
26-100%	r	80.6	19.4	
High Enrollment	c	37.3	22.2	
	T	26.6	6.4	33.0
Column		67	27	94
Total		71.3	28.7	100.0
	X^2=1.98	2df	Probability Level=.3710	N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

Table 4.14

Undergraduate Major of Counselors and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Mathematics		Undergraduate Major				
		Nat. Sci. & Business	Humanities	Social Science	Education	Total
0-10% Low Enrollment	F	5	8	7	8	28
	r	17.9	28.6	25.0	28.6	
	c	22.7	36.4	33.0	32.0	
	T	5.6	8.9	7.8	8.9	31.1
11-30% Medium Enrollment	F	10	8	3	14	35
	r	28.6	22.9	8.6	40.0	
	c	45.5	36.4	14.3	56.0	
	T	11.1	8.9	3.3	15.6	38.9
31-100% High Enrollment	F	7	6	11	3	27
	r	25.9	22.2	40.7	11.1	
	c	31.8	27.3	52.4	12.0	
	T	7.8	6.7	12.2	3.3	30.0
Column Total		22 24.4	22 24.4	21 23.3	25 27.8	90 100.0

X^2=12.45 6df Probability Level=.0527 N.S.

Science		Undergraduate Major				
		Nat. Sci. & Business	Humanities	Social Science	Education	Total
0-10% Low Enrollment	F	7	9	9	9	34
	r	20.6	26.5	26.5	26.5	
	c	31.8	40.9	42.9	37.5	
	T	7.9	10.1	10.1	10.1	38.2
11-25% Medium Enrollment	F	6	10	2	9	27
	r	22.2	37.0	7.4	33.3	
	c	27.3	45.5	9.5	37.5	
	T	6.7	11.2	2.2	10.1	30.3
26-100% High Enrollment	F	9	3	10	6	28
	r	32.1	10.7	35.7	21.4	
	c	40.9	13.6	47.6	25.0	
	T	10.1	3.4	11.2	6.7	31.5
Column Total		22 24.7	22 24.7	21 23.6	24 27.0	89 100.0

X^2=10.44 6df Probability Level=.1074 N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

show similar numbers with the other categories (Humanities, Social Science, and Education). The relationship between the variables was not statistically significant.

The association of the number of college credits in counseling minority students and enrollment of black females in non-required mathematics and science courses is presented in Table 4.15. In the statistical presentation, the number of credits is grouped into two categories: 0-3 and 4-39 credits. Seventy-one percent of the counselors had 0-3 credits in counseling minority students. Sixty-three percent of the total usable sample (N=125) indicated that they had no credits in counseling minority students.

The analysis of the number of college credits in vocational/career development and enrollment of black females in non-required mathematics and science courses is reported in Table 4.16. For statistical analysis, the number of credits is grouped into two categories: 0-3 and 4-50 credits. The relationship between the number of credits and enrollment was not statistically significant.

Professional experience. The association of the variables comprising professional experience and enrollment of black females in non-required mathematics and science courses are presented in Tables 4.17-4.19. The analysis of the number of years in present position and enrollment of black females in non-required mathematics and science courses are reported in Table 4.17. For statistical analysis, the number of years was grouped into three categories: 1-2, 3-9, and 10-28 years. The relationship between the variables was not statistically significant.

Table 4.15

Number of College Credits in Counseling Minority Students and Enrollment of Black Female Students in Non-Required Mathematics and Science Courses

Mathematics		College Credits		
		0-3	4-39	Total
0-10% Low Enrollment	F	22	8	30
	r	73.3	26.7	
	c	31.0	36.4	
	T	23.7	8.6	32.3
11-30% Medium Enrollment	F	29	5	34
	r	85.3	14.7	
	c	40.8	22.7	
	T	31.2	5.4	36.6
31-100% High Enrollment	F	20	9	29
	r	69.0	31.0	
	c	28.2	40.9	
	T	21.5	9.7	31.2
Column Total		71	22	93
		76.3	23.7	100.0

$X^2=2.53$ 2df Probability Level=.2818 N.S.

Science		College Credits		
		0-3	4-39	Total
0-10% Low Enrollment	F	25	11	36
	r	69.4	30.6	
	c	35.7	50.0	
	T	27.2	12.0	39.1
11-25% Medium Enrollment	F	24	2	26
	r	92.3	7.7	
	c	34.3	9.1	
	T	26.1	2.2	28.3
26-100% High Enrollment	F	21	9	30
	r	70.0	30.0	
	c	30.0	40.9	
	T	22.8	9.8	32.6
Column Total		70	22	92
		76.1	23.9	100.0

$X^2=5.24$ 2df Probability Level=.0729 N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

Table 4.16

Number of College Credits in Vocational/Career Development and Enrollment of Black Female Students in Non-Required Mathematics and Science Courses

Mathematics		College Credits		
		0-3	4-50	Total
0-10% Low Enrollment	F	5	25	30
	r	16.7	83.3	
	c	27.8	32.9	
	T	5.3	26.6	31.9
11-30% Medium Enrollment	F	6	29	35
	r	17.1	82.9	
	c	33.3	38.2	
	T	6.4	30.9	37.2
31-100% High Enrollment	F	7	22	29
	r	24.1	75.9	
	c	38.9	28.9	
	T	7.4	23.4	30.9
Column Total		18	76	94
		19.1	80.9	100.0

X^2=.68 2df Probability Level=.7130 N.S.

Science		College Credits		
		0-3	4-50	Total
0-10% Low Enrollment	F	7	29	36
	r	19.4	80.6	
	c	38.9	38.7	
	T	7.5	31.2	38.7
11-25% Medium Enrollment	F	5	22	27
	r	18.5	81.5	
	c	27.8	29.3	
	T	5.4	23.7	29.0
26-100% High Enrollment	F	6	24	30
	r	20.0	80.0	
	c	33.3	32.0	
	T	6.5	25.8	32.3
Column Total		18	75	93
		19.4	80.6	100.0

X^2=.02 2df Probability Level=.9899 N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

Table 4.17

Number of Years Employed in Present Position and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Mathematics		Years in Present Position			
		1-2	3-9	10-28	Total
0-10% Low Enrollment	F	8	10	13	31
	r	25.8	32.3	41.9	
	c	28.6	31.3	36.1	
	T	8.3	10.4	13.5	32.3
11-30% Medium Enrollment	F	13	11	11	35
	r	37.1	31.4	31.4	
	c	46.4	34.4	30.6	
	T	13.5	11.5	11.5	36.5
31-100% High Enrollment	F	7	11	12	30
	r	23.3	36.7	40.0	
	c	25.0	34.4	33.3	
	T	7.3	11.5	12.5	31.3
Column Total		28	32	36	96
		29.2	33.3	37.5	100.0

$X^2=1.94$ 4df Probability Level=.7470 N.S.

Science		Years in Present Position			
		1-2	3-9	10-28	Total
0-10% Low Enrollment	F	10	12	15	37
	r	27.0	32.4	40.5	
	c	35.7	37.5	42.9	
	T	10.5	12.6	15.8	38.9
11-25% Medium Enrollment	F	7	8	12	27
	r	25.9	29.6	44.4	
	c	25.0	25.0	34.3	
	T	7.4	8.4	12.6	28.4
26-100% High Enrollment	F	11	12	8	31
	r	35.5	38.7	25.8	
	c	39.3	37.5	22.9	
	T	11.6	12.6	8.4	32.6
Column Total		28	32	35	95
		29.5	33.7	36.8	100.0

$X^2=2.54$ 4df Probability Level=.6379 N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

The analysis of the number of years of counseling experience and enrollment of black females in non-required mathematics and science courses is reported in Table 4.18. For statistical analysis, the number of years is grouped into three categories: 1-7, 8-13, and 14-26 years. The relationship between the variables was not statistically significant.

The analysis of the number of years of teaching experience and enrollment of black females in non-required mathematics and science courses was reported in Table 4.19. For statistical analysis, the years were grouped into three categories: 2-10, 11-19, and 20-33 years. The relationship between teaching experience and enrollment was not statistically significant.

Discussion

As reported in Table 4.9, none of the demographic variables were statistically significant at the .05 level. However, several variables approached significance when related to the enrollment of black females in non-required mathematics and science courses. For instance, the variable, "undergraduate major" and enrollment in mathematics approached statistical significance (X^2=12.4478, 6df, p=.0527). Similarly, the variables, "number of college credits in counseling minority students," and "number of years of full-time counseling experience," and the enrollment of black females in science approached significnace (X^2=5.2438, 2df, p=.0727; X^2=9.2438, 4df, p=.0553).

Table 4.18

Number of Years of Full-Time Counseling Experience and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Mathematics		Counseling Experience			
		1-7	8-13	14-26	Total
0-10% Low Enrollment	F	12	8	11	31
	r	38.7	25.8	35.5	
	c	40.0	24.2	33.3	
	T	12.5	8.3	11.5	32.3
11-30% Medium Enrollment	F	12	10	13	35
	r	34.3	28.6	37.1	
	c	40.0	30.3	39.4	
	T	12.5	10.4	13.5	36.5
31-100% High Enrollment	F	6	15	9	30
	r	20.0	50.0	30.0	
	c	20.0	45.5	27.3	
	T	6.3	15.6	9.4	31.3
Column Total		30 31.3	33 34.4	33 34.4	96 100.0
	X^2=9.24	4df	Probability Level=.2614		N.S.

Science		Counseling Experience			
		1-7	8-13	14-26	Total
0-10% Low Enrollment	F	13	11	13	37
	r	35.1	29.7	35.1	
	c	43.3	33.3	40.6	
	T	13.7	11.6	13.7	38.9
11-25% Medium Enrollment	F	11	5	11	27
	r	40.7	18.5	40.7	
	c	36.7	15.2	34.4	
	T	11.6	5.3	11.6	28.4
26-100% High Enrollment	F	6	17	8	31
	r	19.4	54.8	25.8	
	c	20.0	51.5	25.0	
	T	6.3	17.9	8.4	32.6
Column Total		30 31.6	33 34.7	32 33.7	95 100.0
	X^2=5.26	4df	Probability Level=.0553		N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

Table 4.19

Number of Years of Teaching Experience and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Mathematics		Teaching Experience			
		2-10	11-19	20-33	Total
	F	8	10	13	31
0-10%	r	25.8	32.3	41.9	
Low Enrollment	c	27.6	34.5	34.2	
•	T	8.3	10.4	13.5	32.3
	F	11	12	12	35
11-30%	r	31.4	34.3	34.3	
Medium Enrollment	c	37.9	41.4	31.6	
	T	11.5	12.5	12.5	36.5
	F	10	7	13	30
31-100%	r	33.3	23.3	43.3	
High Enrollment	c	34.5	24.1	34.2	
	T	10.4	7.3	13.5	31.3
Column		29	29	38	96
Total		30.2	30.2	39.6	100.0
	$X^2=1.42$	4df	Probability	Level=.8414	N.S.

Science		Teaching Experience			
		2-10	11-19	20-33	Total
	F	12	10	15	37
0-10%	r	32.4	27.0	40.5	
Low Enrollment	c	42.9	34.5	39.5	
	T	12.6	10.5	15.8	38.9
	F	6	10	11	27
11-25%	r	22.2	37.0	40.7	
Medium Enrollment	c	21.4	34.5	28.9	
	T	6.3	10.5	11.6	28.4
	F	10	9	12	31
26-100%	r	32.3	29.0	38.7	
High Enrollment	c	35.7	31.0	31.6	
	T	10.5	9.5	12.6	32.6
Column		28	29	38	95
Total		29.5	30.5	40.0	100.0
	$X^2=1.24$	4df	Probability	Level=.8717	N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

Undergraduate major and enrollment of black females in mathematics. The variable, "undergraduate major" is one of three used in this study to describe the educational background of the counselors. In view of several studies (Backer, 1970; Birk, 1974; Casserly, 1978; Engelhard, Jones, & Stiggins, 1976; Thomas & Stewart, 1971) that reported conflicting findings regarding other demographic characteristics of counselors (i.e., race, sex, age), the investigator thought that this variable might reveal the counselors' biases, if any, toward vocational preferences for black females. Although there was not a statistically significant relationship between undergraduate major and enrollment, it was the only variable that approached statistical significance (X^2=12.45, 6df, p=.0527) when related to enrollment of black female students in non-required mathematics courses.

College credits in counseling minority students and enrollment in science. The variable, "number of college credits in counseling minority students" is one of the three variables used to measure the educational background of the counselors. When the credits were grouped into two categories, for statistical purposes, 71.2 percent of the counselors had 0-3 credits in counseling minority students. Sixty-three percent of the total usable sample (N=125) indicated that they had no credits in counseling minority students. A nonsignificant relationship between college credits in counseling minority students and enrollment in science is shown in Table 4.15. However, it was one of two variables that approached significance (X^2=5.25, 2df, p=.0727) when related to enrollment of black female students in non-required science courses.

Full-time counseling experience and enrollment of black female students in science. The variable, "years of full-time counseling experience," is one of four variables used to measure the professional experience of counselors. While this variable was not statistically significant at the .05 level percent, it did approach significance (X^2=9.24, 4df, p=.0553). The mean score for the number of years of counseling experience is 11.1 (Table 4.1). As reported in Table 4.18, counselors with 8-13 years of experience reported a "high enrollment" of black female students in non-required science courses.

Characteristics of Guidance Programs and Enrollment of Black Females in Non-required Mathematics and Science Courses

This section of the analysis concerns the second research question:

> Does the enrollment of black female students in non-required mathematics and science courses vary systemically according to the characteristics of guidance programs?

The research question focused on the relationship of each of the dependent variables (enrollment of black females in non-required mathematics and enrollment of black females in non-required science) to the following independent variables: (a) organization of guidance programs, (b) philosophy of guidance programs, (c) counselor/student ratio (number of students assigned), and (d) autonomy of counselors.

Results

Chi square analyses were used to examine the independent variables, "organization of guidance programs" and "counselor/student ratio" and forward stepwise multiple regression analyses were used to examine the philosophy of guidance program variables and autonomy of counselors variables. The latter procedure allows each independent variable to enter the equation one at a time. The variable which has the strongest correlation with the dependent variable is selected as the Step One variable. The remaining variables follow in the order of strongest to weakest correlation, given the initial variables in the equation, with the dependent variable until all independent variables have entered the equation.

The results from the chi square analyses are reported in Tables 4.20 and 4.21. The observed frequencies and row, column, and total percentages are presented in the contingency tables.

Organization of guidance programs. The analysis of the organization of guidance programs and the enrollment of black female students in non-required mathematics and science courses are reported in Table 4.20. For statistical analysis, the random method and the alphabetical method were combined because only two respondents indicated that students were assigned "randomly" to counselors. The "specialists" and "other" methods were deleted because comments on these methods suggested that the counselors did not interpret the question properly. For example, comments on "specialist" included such statements as "all counselors are specialists." Counselors who

Table 4.20

Organization of Guidance Programs and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Mathematics		Organization of Guidance Programs			
		Alphabetically and Randomly	Single Grade	Entering Class	Total
	F	11	9	10	30
0-10%	r	36.7	30.0	33.3	
Low Enrollment	c	26.2	60.0	40.0	
	T	13.4	11.0	12.2	36.6
	F	15	2	9	26
11-30%	r	57.7	7.7	34.6	
Medium Enrollment	c	35.7	13.3	36.0	
	T	18.3	2.4	11.0	31.7
	F	16	4	6	26
31-100%	r	61.5	15.4	23.1	
High Enrollment	c	38.1	26.7	24.0	
	T	19.5	4.9	7.3	31.7
Column		42	15	25	82
Total		51.2	18.3	30.5	100.0
	X^2=6.65	4df	Probability Level=.1555		N.S.

Science		Organization of Guidance Programs			
		Alphabetically and Randomly	Single Grade	Entering Class	Total
	F	18	9	9	36
0-10%	r	50.0	25.0	25.0	
Low Enrollment	c	42.9	60.0	37.5	
	T	22.2	11.1	11.1	44.4
	F	11	2	5	18
11-25%	r	61.1	11.1	27.8	
Medium Enrollment	c	26.2	13.3	20.8	
	T	13.6	2.5	6.2	22.2
	F	13	4	10	27
26-100%	r	48.1	14.8	37.0	
High Enrollment	c	31.0	26.7	41.7	
	T	16.0	4.9	12.3	33.3
Column		42	15	24	81
Total		51.9	18.5	29.6	100.0
	X^2=2.72	4df	Probability Level=.6050		N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

checked "other" were asked to specify the method used. Some counselors specified no method; while others made vague comments such as "students are free to visit any counselor of their choice" or "1½ counselors are assigned to all students." The relationship between the organization of guidance programs and enrollment was not statistically significant.

Counselor/student ratio. The analysis of the number of students assigned to counselors and the enrollment of black female students in mathematics and science courses is reported in Table 4.21. For statistical analysis, the data were grouped into three categories: 0-275, 276-400, and 401+. The relationship between the variables was not statistically significant at the .05 level.

Forward stepwise multiple regression analyses were used to examine the relationship of the eight philosophy of guidance variables and the six autonomy of counselor variables to the enrollment of black female students in non-required mathematics and science courses.

Philosophy of guidance programs. The intercorrelations among the eight philosophy of guidance program variables are reported in Tables 4.22 and 4.23. Values significantly different from zero at the .05 level are indicated in the correlation matrices. In this case, the variable, "working with parents and community agencies to meet the students' needs" had the highest Pearson r's (Pearson Product-Moment) correlation coefficients (.16 and .13, respectively) when related to both dependent variables.

Table 4.21

Counselor/Student Ratio and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Mathematics		Counselor/Student Ratio			
		0-275	276-400	401+	Total
	F	14	5	14	33
0-10%	r	42.4	15.2	42.4	
Low Enrollment	c	34.1	16.7	48.3	
	T	14.0	5.0	14.0	33.0
	F	16	12	8	36
11-30%	r	44.4	33.3	22.2	
Medium Enrollment	c	39.0	40.0	27.6	
	T	16.0	12.0	8.0	36.0
	F	11	13	7	31
31-100%	r	35.5	41.9	22.6	
High Enrollment	c	26.8	43.3	24.1	
	T	11.0	13.0	7.0	31.0
Column		41	30	29	100
Total		41.0	30.0	29.0	100.0

X^2=7.44 4df Probability Level=.1143 N.S.

Science		Counselor/Student Ratio			
		0-275	276-400	401+	Total
	F	18	6	15	39
0-10%	r	46.2	15.4	38.5	
Low Enrollment	c	45.0	20.0	51.7	
	T	18.2	6.1	15.2	39.4
	F	13	9	6	28
11-25%	r	46.4	32.1	21.4	
Medium Enrollment	c	32.5	30.0	20.7	
	T	13.1	9.1	6.1	28.3
	F	9	15	8	32
26-100%	r	28.1	46.9	25.0	
High Enrollment	c	22.5	50.0	27.6	
	T	9.1	15.2	8.1	32.3
Column		40	30	29	99
Total		40.4	30.3	29.3	100.0

X^2=9.47 4df Probability Level=.0503 N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

Table 4.22

Correlation Matrix for Philosophy of Guidance Variables and Enrollment of Black Female Students in Non-required Mathematics Courses

	Individual and group data	Maladaptive behavior	Equal opportunity	Remedial services	Career development activities	Value clarification	Problem-solving and decision making	Parents and community	Enrollment in mathematics
1. Providing individual and group data about students for school-wide program planning and development.									
2. Reducing and eliminating maladaptive behavior of students (e.g., truancy, classroom misconduct, etc.	.54*								
3. Providing equal opportunity for all students.	.31*	.36*							
4. Providing remedial services for students with special educational needs.	.32*	.30*	.49*						
5. Providing career development activities for all students.	.22*	.18*	.27*	.33*					
6. Promoting value clarification and self-awareness for all students.	.52*	.30*	.51*	.61*	.50*				
7. Promoting problem-solving and decision-making skills for all students.	.52*	.41*	.52*	.62*	.58*	.84*			
8. Working with parents and community agencies to meet students' needs.	.38*	.32*	.47*	.59*	.42*	.57*	.62*		
9. Enrollment of black female students in non-required mathematics courses.	.10	.09	.03	.13	.10	-.01	.04	.16	

*Significant at .05 level.

Table 4.23

Correlation Matrix for Philosophy of Guidance Variables and Enrollment of Black Female Students in Non-required Science Courses

	Individual and group data	Maladaptive behavior	Equal opportunity	Remedial services	Career development activities	Value clarification	Problem-solving and decision making	Parents and community	Enrollment in science
1. Providing individual and group data about students for school-wide program planning and development.									
2. Reducing and eliminating maladaptive behavior of students (e.g., truancy, classroom misconduct, etc.).	.54*								
3. Providing equal opportunity for all students.	.31*	.36*							
4. Providing remedial services for students with special educational needs.	.32*	.20*	.49*						
5. Providing career development activities for all students.	.22*	.18*	.27*	.33*					
6. Promoting value clarification and self-awareness for all students.	.52*	.30*	.51*	.61*	.50*				
7. Promoting problem-solving and decision-making skills for all students.	.52*	.41*	.52*	.62*	.58*	.84*			
8. Working with parents and community agencies to meet students' needs.	.38*	.32*	.47*	.59*	.42*	.57*	.62*		
9. Enrollment of black female students in non-required science courses.	.02	.08	.00	.06	.05	-.09	-.03	.13	

*Significant at .05 level.

The results of the regression analysis of the philosophy of guidance programs with enrollment of black female students in non-required mathematics and science courses are reported in Tables 4.24 and 4.25. The results of the analysis presented in Table 4.24 suggest that the "philosophy of guidance program" variables were not statistically significant factors for accounting for the variance in the enrollment of black female students in non-required mathematics and science courses. The multiple correlation coefficient (R) of .28 was not statistically significant at the .05 level, consequently the amount of variance explained by the seven variables was not significantly different from zero. In addition, none of the individual variables were statistically significant as indicated by the F-ratio values. One variable, "reducing and eliminating maladaptive behavior of student (e.g., truancy, classroom misconduct, etc.)" was omitted from the summary because the individual F-ratio was insufficient for inclusion.

As reported in Table 4.25, the results of the analysis suggest that the philosophy of guidance program variables were not significant factors in the enrollment of black female students in non-required science courses. The multiple correlation coefficient (R) of .27 was not statistically significant at the .05 level. Consequently, the amount of variance explained by the eight variables was not significantly different from zero.

Table 4.24

Summary of Multiple Regression Analysis Relating the Philosophy of Guidance Program (Independent Variable) with Enrollment of Black Female Students in Non-required Mathematics Courses (N=100)

	R	R^2	R^2 Change	Adjusted R^2	Standard Error	F
1. Working with parents and community agencies to meet students' needs.	.16	.03	X	.02	23.44	2.37 (n.s.)
2. Promoting value clarification and self-awareness for all students.	.21	.04	.02	.02	23.37	1.95 (n.s.)
3. Providing remedial services for students with special educational needs.	.23	.05	.01	.02	23.36	1.65 (n.s.)
4. Providing individual and group data about students for school wide program planning and development.	.26	.07	.01	.02	23.35	1.51 (n.s.)
5. Providing career development activities for all students.	.28	.08	.01	.02	23.37	1.38 (n.s.)
6. Promoting problem-solving and decision-making skills for all students.	.28	.08	.00	.01	23.50	1.16 (n.s.)
7. Providing equal opportunity for all students.	.28	.08	.00	-.00*	23.63	.99 (n.s.)

Reducing and eliminating maladaptive behavior of students (e.g., truancy, classroom misconduct, etc.) was omitted from summary by the program (SPSS) because the computed F-ratio was insufficient for inclusion.

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*result of rounding error in computer program

Table 4.25

Summary of Multiple Regression Analysis Relating the Philosophy of Guidance Program (Independent Variable) with Enrollment of Black Female Students in Non-required Science Courses (N=99)

	R	R^2	R^2 Change	Adjusted R^2	Standard Error	F
1. Working with parents and community agencies to meet students' needs.	.13	.02	X	.00	21.04	1.42 (n.s.)
2. Promoting value clarification and self-awareness for all students.	.23	.05	.04	.03	20.76	2.44 (n.s.)
3. Reducing and eliminating mal-adaptive behavior of students(e.g., truancy, classroom misconduct, etc.)	.24	.06	.00	.03	20.83	1.76 (n.s.)
4. Providing career development activities for all students.	.25	.06	.00	.02	20.90	1.42 (n.s.)
5. Providing remedial services for students with special educational needs.	.26	.07	.00	.01	20.98	1.19 (n.s.)
6. Promoting problem-solving and decision-making skills for all students.	.26	.07	.00	.00	21.09	1.01 (n.s.)
7. Providing individual and group data about students for school wide program planning and development.	.27	.07	.00	-.01*	21.20	.87 (n.s.)
8. Providing equal opportunity for all students.	.27	.07	.00	-.02*	21.33	.76 (n.s.)

*result of rounding error in computer program

Autonomy of counselors. The intercorrelations among the seven autonomy of counselor variables are reported in Tables 4.26 and 4.27. Values significantly different from zero at the .05 level are indicated in the correlation matrices. The variable, "developing programs that will provide assistance to special population groups (i.e., females)," had the highest coefficient of .21 when related to enrollment of black female students in non-required mathematics courses. This same variable and one other variable, "establishing student conduct rules in the school," had the highest coefficients (.26 and .22, respectively) when related to enrollment of black female students in non-required science courses.

The results of the regression analysis of the "autonomy of counselors" variables with enrollment of black female students in non-required mathematics and science courses are reported in Tables 4.28 and 4.29. The results of the analysis presented in Table 4.28 suggest that several of the "autonomy of counselors" variables were significant in their relationship to enrollment of black females in non-required mathematics courses. The multiple correlation coefficient (R) of .33 was statistically significant. The amount of variance (Adjusted R^2) explained by the six variables in the enrollment of black females in non-required mathematics courses was .07. The Adjusted R^2 is the coefficient of determination which indicates the amount of variance in the dependent variable explained by the independent variables under consideration. This means that approximately 7.0 percent of the variation in the dependent variables

Table 4.26

Correlation Matrix for Autonomy of Counselor Variables and Enrollment of Black Female Students in Non-required Mathematics Courses

	Student conduct rules	Criteria for taking non-required math & science courses	Transfer students to programs or courses	Programs for special population groups	Criteria for cut-off scores for placement	Report student progress to parents	Enrollment in mathematics
1. The establishment of student conduct rules in the school.							
2. The establishing of the criteria for students taking non-required courses in mathematics and science.	.54*						
3. The transferring of students to programs or courses that will better match their abilities and interests.	.26*	.34*					
4. The developing of programs that will provide assistance to special population groups (e.g., for females).	.41*	.46*	.30*				
5. The establishing of the criteria for cut-off scores for placement of students in non-required science and mathematics courses.	.45*	.57*	.19*	.45*			
6. The development of procedures for reporting student progress to parents.	.33*	.46*	.13	.22*	.39*		
7. Enrollment of black female students in non-required mathematics courses.	.09	-.05	.00	.21*	-.04	-.16	

*Significant at .05 level.

Table 4.27

Correlation Matrix for Autonomy of Counselor Variables and Enrollment of Black Female Students in Non-required Science Courses

	Student conduct rules	Criteria for taking non-required math & science courses	Transfer students to programs or courses	Programs for special population groups	Criteria for cut-off scores for placement	Report student progress to parents	Enrollment in science
1. The establishment of student conduct rules in the school.							
2. The establishing of the criteria for students taking non-required courses in mathematics and science.	.53*						
3. The transferring of students to programs or courses that will better match their abilities and interests.	.25*	.34*					
4. The developing of programs that will provide assistance to special population groups (e.g., for females).	.42*	.47*	.30*				
5. The establishing of the criteria for cut-off scores for placement of students in non-required science and mathematics courses.	.47*	.59*	.20*	.44*			
6. The development of procedures for reporting student progress to parents.	.33*	.47*	.13	.22*	.39*		
7. Enrollment of black female students in non-required science courses.	.22*	.00	-.02	.26	.09	-.05	

*Significant at .05 level.

Table 4.28

Summary of Multiple Regression Analysis Relating Autonomy of Counselors with Enrollment of Black Female Students in Non-required Mathematics Courses (N=100)

	R	R^2	R^2 Change	Adjusted R^2	Standard Error	F
1. The developing of programs that will provide assistance to special population groups (e.g., for females).	.21	.04	X	.03	23.86	4.20*
2. The development of procedures for reporting student progress to parents.	.30	.09	.04	.07	23.42	4.34*
3. The establishing of the criteria for students taking non-required courses in mathematics and science.	.31	.10	.01	.07	23.46	3.14*
4. The establishment of student conduct rules in the school.	.33	.11	.01	.07	23.46	2.61*
5. The establishing of the criteria for cut-off scores for placement of students in non-required science and mathematics courses.	.34	.11	.01	.06	23.52	2.19 (n.s.)
6. The transferring of students to programs or courses that will better match their abilities and interests.	.34	.11	.00	.05	23.64	1.83 (n.s.)

*$p \leq .05$

Table 4.29

Summary of Multiple Regression Analysis Relating Autonomy of Counselors with Enrollment of Black Female Students in Non-required Science Courses (N=99)

	R	R^2	R^2 Change	Adjusted R^2	Standard Error	F
1. The developing of programs that will provide assistance to special population groups (e.g., for females).	.26	.07	X	.06	20.58	6.28*
2. The establishment of student conduct rules in the school.	.28	.08	.01	.06	20.52	3.86*
3. The establishing of the criteria for cut-off scores for placement of students in non-required science and mathematics courses.	.33	.11	.03	.08	20.32	3.57*
4. The development of procedures for reporting student progress to parents.	.35	.12	.01	.08	20.32	2.92*
5. The transferring of students to programs or courses that will better match their abilities and interests.	.36	.13	.01	.08	20.34	2.49*

The establishing of the criteria for students taking non-required courses in mathematics and science variable was omitted from summary by the program (SPSS) because the computed F-ratio was insufficient for inclusion.

*$p \leq .05$

can be attributed to the selected independent variables. Four of the variables had significant F-ratios: (a) developing programs to assist special population groups (e.g., females), (b) developing procedures for reporting student progress to parents, (c) establishing the criteria for students' taking non-required mathematics and science courses, and (d) establishing student conduct rules in the school. The other variable, "establishing the criteria for cut-off scores for placement of students in non-required science and mathematics courses" and "the transferring of students to programs or courses that will match their ability and interests" did not contribute to the explanation of variance in enrollment of black females in non-required mathematics courses.

As reported in Table 4.29, a strong relationship exists between the "autonomy of counselors" variables and enrollment of black female students in science. The multiple correlation coefficient (R) of .36 was statistically significant. The amount of variance (Adjusted R^2) explained by the five variables to the enrollment of black females enrolled in science was .08. Thus, approximately 8.0 percent of the variation in the dependent variable can be attributed to the selected independent variables. Five of the variables had significant regressions as indicated by the F-ratios. One variable, "the establishing of the criteria for cut-off scores for placement of students in non-required science and mathematics courses," was omitted from the summary by the program because the individual F-ratio was insufficient for inclusion.

Discussion

The results of the analyses used to determine the relationship of the characteristics of guidance programs and the enrollment of black female students in non-required mathematics and science courses indicated that the "autonomy of counselors" variables were statistically significant at the .05 level. One other variable, "counselor/student ratio," approached statistical significance when related to enrollment in science (X^2=9.47, 4df, p=.0503).

Four of the "autonomy of counselors" variables were statistically significant when related to the dependent variable, "enrollment of black females in non-required mathematics courses": (a) developing programs that will provide assistance to special population groups (i.e., females), (b) developing procedures for reporting student progress to parents, (c) establishing the criteria for students taking non-required mathematics and science courses, and (d) establishing student conduct rules in the school. The variable, "developing programs that will provide assistance to special groups (i.e., females)" was indicated as the Step One in the forward stepwise multiple regression procedure. This means that this variable is more closely associated with the enrollment of black females in mathematics than the other variables. Thus, it appears that counselors who have the autonomy of providing "programs" for special populations (i.e., females) contribute to the enrollment of black female students in non-required mathematics courses.

Two variables, "establishing the criteria for cut-off scores for placement of students in non-required science and mathematics courses" and "transferring of students to programs or courses that will match their abilities and interests," were included in the summary of the regression analysis but were not statistically significant when related to the dependent variable, enrollment of black females in non-required mathematics courses. Thus, it appears that those variables which are related to the general academic policy planning and decision making for all students have no impact on the extent to which counselors enroll black females in non-required mathematics courses.

Based on the results of the analysis summarized in Table 4.28, the four variables that were statistically significant when related to enrollment in mathematics courses were also statistically significant to the enrollment of black females in non-required science courses (Table 4.29). One other variable, "transferring students to programs or courses that will better match their abilities and interests," was also statistically significant in relationship to enrollment in science. The variable, "developing programs that will provide assistance to special population groups (e.g., females)," was also reported as Step One in both tables in the stepwise regression analysis. Again, it appears that counselors who have the autonomy of providing programs for special populations contribute to the enrollment of black females in non-required science courses.

On the whole, four of the autonomy of counselors variables that were statistically significant for the enrollment of black females in mathematics were also statistically significant for the enrollment of black female students in non-required science courses. However, in each case, the variable, "developing programs that provide assistance to special population groups" was reported as Step One in the stepwise regression procedure; and the variable, "establishing criteria for students taking non-required courses in mathematics and science" was reported as Step Three. This means that both variables had the same ordering when related to the enrollment of black female students in non-required mathematics or science courses.

As reported in Table 4.21, the association of the counselor/student ratio and enrollment of black students in non-required science courses was not statistically significant at the .05 level. However, the relationship between the variables approached significance (X^2=9.47, 4df, p=.0503) when related to enrollment in science courses.

Characteristics of Counseling and Guidance Program Practices and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

This section of the analysis addresses the third research question:

> Does the enrollment of black female students in non-required mathematics and science courses vary systemically according to the counseling and guidance practices?

This research question focused on the relationship of each of the two dependent variables, "enrollment of black female students in non-required mathematics courses," and "enrollment of black female students in non-required science courses," to the following independent variables: (a) amount of involvement counselors report in specific counseling and guidance practice activities; (b) the amount of time counselors spend with students in educational and career planning, personal and/or social adjustment, and other job related activities; (c) prerequisites considered most important when enrolling students in non-required mathematics and science courses; (d) how often students (black females) request assistance about taking non-required mathematics and science courses; and (e) special efforts used to enroll black female students in non-required mathematics and science courses.

Results

Forward stepwise multiple regressions were used to analyze the variables: (a) amount of involvement counselors report in specific counseling and guidance practice activities; (b) amount of time counselors spend with students in educational and career planning, personal and/or social adjustment and other job related activities; and (c) prerequisites considered most important when enrolling students in non-required mathematics and science courses. Chi square analysis was used to examine the variables, "how often students (black females) request assistance about taking non-required mathematics and science courses," and "special efforts used to encourage black female students to enroll in non-required mathematics and science courses."

Amount of involvement. The intercorrelations among the nine "amount of involvement" variables are reported in Tables 4.30 and 4.31. Values significantly different from zero at the .05 level are indicated in the correlation matrices. In this case, the variables "counseling students in developing their special abilities," and "providing career day programs," had the highest coefficients (.16 and .16, respectively) when related to enrollment of black female students in non-required mathematics courses. The variable, "providing career day programs," had the highest coefficient (.22) when related to the enrollment of black female students in non-required science courses (Table 4.31).

The results of the regression analysis of the amount of involvement counselors report in specific activities with the enrollment of black female students in non-required mathematics and science courses are reported in Tables 4.32 and 4.33. The results of the analysis presented in Table 4.32 suggest that the "amount of involvement" variables were not statistically significant factors in the enrollment of black female students in non-required mathematics courses. The multiple correlation coefficient (R) of .27 was not statistically significant; consequently, the amount of variance explained by the variables was not significantly different from zero. One of the variables, "organizing field trips," was omitted from the summary because it did not contribute significantly to the

Table 4.30

Correlation Matrix for Amount of Involvement Counselors Report in Specific Counseling and Guidance Practice Activities and Enrollment of Black Female Students in Non-required Mathematics Courses

	High school courses	Program of study	Special abilities	Field trips	Career development	Career day programs	Audio-visual aids	Recommending readings	Meeting with teachers	Enrollment in mathematics
1. Assisting students in selecting their high school courses.										
2. Assisting students in selecting a program of study (e.g., college prep., general, etc.).	.49*									
3. Counseling students in developing their special abilities.	.22*	.27*								
4. Organizing field trips for students.	-.04	.24*	.25*							
5. Assisting students with career development (e.g., occupational choice, college choice, post high school work, etc.).	.10	.25*	.38*	.26*						
6. Providing career day programs.	-.02	.09	.17*	.05	.26*					
7. Providing audio-visual aids as a means of acquainting students with careers.	-.09	.09	.25*	.29*	.46*	.18*				
8. Recommending readings (e.g., in the library) about various careers.	.06	.25*	.33*	.29*	.48*	.15	.48*			
9. Meeting with teachers regarding specific students.	.17*	.10	.35*	.17*	.30*	.26*	.23*	.39*		
10. Enrollment of black female students in non-required mathematics courses.	.12	.04	.16	.00	.03	.16	.07	-.01	.03	

*Significant at .05 level.

Table 4.31

Correlation Matrix for Amount of Involvement Counselors Report in Specific Counseling and Guidance Practice Activities and Enrollment of Black Female Students in Non-required Science Courses

	High school courses	Program of study	Special abilities	Field trips	Career development	Career day programs	Audio-visual aids	Recommending readings	Meeting with teachers	Enrollment in science
1. Assisting students in selecting their high school courses.										
2. Assisting students in selecting a program of study (e.g., college prep., general, etc.).	.50*									
3. Counseling students in developing their special abilities.	.22*	.27*								
4. Organizing field trips for students.	-.04	.23*	.25*							
5. Assisting students with career development (e.g., occupational choice, college choice, post high school work, etc.).	.10	.27*	.39*	.27*						
6. Providing career day programs.	-.02	.10	.17*	.06	.26*					
7. Providing audio-visual aids as a means of acquainting students with careers.	-.08	.07	.24*	.27*	.48*	.20*				
8. Recommending readings (e.g., in the library) about various careers.	.07	.23*	.33*	.28*	.50*	.17*	.46*			
9. Meeting with teachers regarding specific students.	.17*	.09	.35*	.17*	.31*	.27*	.23*	.39*		
10. Enrollment of black female students in non-required science courses	.10	-.00	.17*	-.03	.04	.22*	.17*	-.02	.03	

*Significant at .05 level.

Table 4.32

Summary of Multiple Regression Analysis Relating Amount of Involvement Counselors Report in Specific Counseling and Guidance Practice Activities and Enrollment of Black Female Students in Non-required Mathematics Courses (N=100)

	R	R^2	R^2 Change	Adjusted R^2	Standard Error	F
1. Counseling students in developing their special abilities.	.16	.03	X	.02	23.81	2.59 (n.s.)
2. Providing career day programs.	.21	.04	.02	.02	23.71	2.21 (n.s.)
3. Assisting students in selecting their high school courses.	.23	.05	.01	.02	23.74	1.74 (n.s.)
4. Recommending readings (e.g., in the library) about various careers.	.24	.06	.01	.02	23.78	1.47 (n.s.)
5. Providing audio-visual aids as a means of acquainting students with careers.	.25	.06	.01	.01	23.84	1.27 (n.s.)
6. Assisting students with career development (e.g., occupational choice, college choice, post high school work, etc.).	.26	.07	.00	.01	23.92	1.12 (n.s.)
7. Meeting with teachers regarding specific students.	.27	.07	.00	-.00*	24.02	.99 (n.s.)
8. Assisting students in selecting a program of study (e.g., college prep., general, etc.).	.27	.07	.00	-.01*	24.12	.89 (n.s.)

(continued)

Table 4.32

Summary of Multiple Regression Analysis Relating Amount of Involvement Counselors Report in Specific Counseling and Guidance Practice Activities and Enrollment of Black Female Students in Non-required Mathematics Courses (N=100)

(continued)

Organizing field trips for students variable was omitted by the program (SPSS) from the summary because the F-ratio was insufficient for inclusion

*Results of rounding error in computer program.

Table 4.33

Summary of Multiple Regression Analysis Relating Amount of Involvement Counselors Report in Specific Counseling and Guidance Practice Activities and Enrollment of Black Female Students in Non-required Science Courses (N=99)

	R	R^2	R^2 Change	Adjusted R^2	Standard Error	F
1. Providing career day programs.	.22	.05	X	.04	20.54	5.03*
2. Counseling students in developing their special abilities.	.26	.07	.02	.05	20.45	3.49*
3. Recommending readings (e.g., in the library) about various careers.	.29	.08	.01	.05	20.42	2.75*
4. Providing audio-visual aids as a means of acquainting students with careers.	.33	.11	.02	.07	20.25	2.74*
5. Assisting students in selecting their high school courses.	.34	.12	.01	.07	20.25	2.39*
6. Assisting students in selecting a program of study (e.g., college prep., general, etc.).	.35	.12	.01	.07	20.26	2.14 (n.s.)
7. Assisting students with career development (e.g., occupational choice, college choice, post high school work, etc.).	.36	.13	.01	.06	20.31	1.91 (n.s.)
8. Meeting with teachers regarding specific students.	.37	.14	.00	.06	20.37	1.72 (n.s.)

(continued)

Table 4.33

Summary of Multiple Regression Analysis Relating Amount of Involvement Counselors Report in Specific Counseling and Guidance Practice Activities and Enrollment of Black Female Students in Non-required Science Courses (N=99)

(continued)

	R	R^2	R^2 Change	Adjusted R^2	Standard Error	F
9. Organizing field trips for students.	.37	.14	.00	.05	20.46	1.54 (n.s.)

*$p \leq .05$

explanation of variance in the dependent variable. The individual F-ratio in this instance was insufficient for inclusion.

As revealed in Table 4.33, five of the "amount of time counselors spend assisting students in educational and vocational/occupational planning" variables were significant in enrollment of black female students in non-required science courses. The multiple correlation coefficient (R) of .34 was statistically significant. The amount of variance explained by the variables in the enrollment of black females in science was .07, indicating that approximately 7.0 percent of the variation in the dependent variable can be attributed to the selected independent variables. The five significant variables included: (a) providing career programs; (b) counseling students in developing their special abilities; (c) recommending readings (e.g., in the library) about various careers; (d) providing audio-visual aids as a means of acquainting students with careers; and (e) assisting students in selecting their high school courses.

Amount of time. The intercorrelations among the four "amount of time counselors spend with students" variables are reported in Tables 4.34 and 4.35. Values significantly different from zero at the .05 level are indicated in the correlation matrices. In this case, the variable, "assisting students in career planning (e.g., occupational choice, college choice) had the highest coefficient (.20) when related to the enrollment of black female students in non-required mathematics courses. The variable, "assisting students in high school educational planning (e.g., courses and programs selection)," had the highest

Table 4.34

Correlation Matrix for Amount of Time Counselors Spend with Students in Educational and Career Planning, Personal and/or Social Adjustment and Other Job Related Activites and Enrollment of Black Female Students in Non-required Mathematics Courses

	Educational planning	Career Planning	Personal and/or social adjustments	Other	Enrollment in mathematics
1. Assisting students in high school educational planning (e.g., course and program selection).					
2. Assisting students in career planning (e.g., occupational choice, college choice, etc.).	-.13				
3. Assisting students with personal and/or social adjustments.	-.58*	-.35*			
4. Other.	-.45*	-.32*	-.11		
5. Enrollment of black female students in non-required mathematics courses.	-.07	.20	-.03	-.05	

Table 4.35

Correlation Matrix for Amount of Time Counselors Spend with Students in Educational and Career Planning, Personal and/or Social Adjustment and Other Job Related Activities and Enrollment of Black Female Students in Non-required Science Courses

	Educational planning	Career planning	Personal and/or social adjustments	Other	Enrollment in science
1. Assisting students in high school educational planning (e.g., course and program selection).					
2. Assisting students in career planning (e.g., occupational choice, college choice, etc.).	-.13				
3. Assisting students with personal and/or social adjustments.	-.58*	-.35*			
4. Other.	-.45*	-.32*	-.11		
5. Enrollment of black female students in non-required science courses.	-.14	.10	.10	-.02	

Pearson r (-.14) when related to the enrollment of black females in non-required science courses (Table 4.35).

The results of the regression analysis of the amount of time counselors spend with students in educational and career planning, personal/social adjustment, and other job related activities with enrollment of black females in non-required mathematics and science courses are reported in Tables 4.36 and 4.37. The results of the analysis in Table 4.36 suggest that the "amount of time" variables were not statistically significant factors in the enrollment of black females in non-required mathematics courses. The multiple correlation coefficient (R) was not significantly different from zero. The two variables in the summary, "assisting students in career planning (e.g., occupational choice, college choice, etc.)." and "assisting students in high school educational planning (e.g., courses and program selection)" did not have significant F-ratio values. In adddition, two other variables, "assisting students with personal and/or social adjustments," and "other" were omitted from the summary entirely because their F-ratio values were insufficient for inclusion.

From the analysis in Table 4.37, the variables, "amount of time counselors spend assisting students in educational planning, career planning, personal/social adjustment, and other job related activities," were not significantly related to the enrollment of black female students in non-required science courses. None of the F-ratio values were statistically significant.

Table 4.36

Summary of Multiple Regression Analysis Relating Amount of Time Counselors Spend With Students in Educational and Career Planning, Personal and/or Social Adjustments, and Other Job Related Activities and Enrollment of Black Female Students in Non-required Mathematics Courses (N=100)

	R	R^2	R^2 Change	Adjusted R^2	Standard Error	F
1. Assisting students in career planning (e.g., occupational choice, college choice, etc.).	.20	.04	X	.02	23.70	1.95 (n.s.)
2. Assisting students in high school educational planning (e.g., course and program selection).	.20	.04	.00	.00	23.92	1.01 (n.s.)

Assisting students with personal and/or social adjustments variable and "other" variables were omitted by the program (SPSS) from summary because F-ratio was insufficient for inclusion.

Table 4.37

Summary of Multiple Regression Analysis Relating Amount of Time Counselors Spend With Students in Educational and Career Planning, Personal and/or Social Adjustments, and Other Job Related Activities and Enrollment of Black Female Students in Non-required Science Courses (N=99)

	R	R^2	R^2 Change	Adjusted R^2	Standard Error	F
1. Assisting students in high school educational planning (e.g., course and program selection).	.14	.02	X	.00	20.39	1.01 (n.s.)
2. Other	.17	.03	.01	-.01*	20.52	.70 (n.s.)
3. Assisting students in career planning (e.g., occupational choice, college choice, etc.).	.17	.03	.00	-.03*	20.71	.50 (n.s.)
4. Assisting students with personal and/or social adjustments.	.19	.04	.01	-.05*	20.87	.44 (n.s.)

*Result of rounding error in computer program.

The multiple correlation coefficient (R) of .19 was not statistically significant.

Prerequisites. The intercorrelations among the seven "prerequisites considered important when enrolling students into non-required mathematics and science courses" are reported in Tables 4.38 and 4.39. Values significantly different from zero at the .05 level are indicated in the correlation matrices. The variables, "grade point average in previous mathematics course" and "student expressed career interest" had the highest coefficients when related to the enrollment of black female students in non-required mathematics courses (.16 and .16, respectively). As shown in Table 4.39, the variable, "recommendation from counselor" had the highest coefficient (.20) when related to enrollment of black female students in non-required science courses. The variable, "other," was deleted from the analysis because the wide differences among responses made them impossible to categorize.

The analysis of the prerequisites considered important when enrolling students in non-required mathematics and science courses are reported in Tables 4.40 and 4.41. From the results summarized in Table 4.40, the variables concerned with "prerequisites" were not statistically significant factors in the enrollment of black female students in non-required mathematics courses. The multiple correlation coefficient (R) of .26 was not statistically significant; consequently, the amount of variance explained by the variables was not significantly different from zero.

Table 4.38

Correlation Matrix for Prerequisites Considered Important When Enrolling Students in Non-required Mathematics Courses and Enrollment of Black Female Students in Non-required Mathematics Courses

	Cumulative grade point average	Average in previous math course/ science course	Program of study	Recommendation from counselor	Recommendation from teacher	Student expressed career interest	Enrollment in mathematics
1. Cumulative grade point average.							
2. Grade point average in previous mathematics courses.	.24*						
3. Program of study (e.g., college prep., general, etc.).	.23*	.18*					
4. Recommendation from counselor.	.20*	.08	.22*				
5. Recommendation from teacher.	.10	.15	.11	.27*			
6. Student expressed career interest.	.26*	.05	.37*	.23*	-.02		
7. Enrollment of black female students in non-required mathematics courses	.02	.16	.04	.04	.09	.16	

*Significant at .05 level.

Table 4.39

Correlation Matrix for Prerequisites Considered Important When Enrolling Students in Non-required Science Courses and Enrollment of Black Female Students in Non-required Science Courses

	Cumulative grade point average	Average in previous math course/ science course	Program of study	Recommendation from counselor	Recommendation from teacher	Student expressed career interest	Enrollment in science
1. Cumulative grade point average.							
2. Grade point average in previous science courses.	.27*						
3. Program of study (e.g., college prep., general, etc.).	.20*	.21*					
4. Recommendation from counselor.	.24*	.09	.21*				
5. Recommendation from teacher.	.01	.22*	.11	.25*			
6. Student expressed career interest.	.22*	.02	.44*	.27*	-.06		
7. Enrollment of black female students in non-required science courses	.01	.09	-.03	.20	.16	.17	

*Significant at .05 level.

Table 4.40

Summary of Multiple Regression Analysis Relating Prerequisites Considered Important When Enrolling Students in Non-required Mathematics Courses and Enrollment of Black Female Students in Non-required Mathematics Courses (N=100)

	R	R^2	R^2 Change	Adjusted R^2	Standard Error	F
1. Student expressed career interest.	.16	.03	X	.02	23.58	2.51 (n.s.)
2. Grade point average in previous mathematics course.	.23	.05	.02	.03	23.41	2.45 (n.s.)
3. Recommendation from teacher.	.24	.06	.01	.03	23.45	1.86 (n.s.)
4. Cumulative grade point.	.25	.06	.01	.02	23.50	1.53 (n.s.)
5. Program of study (e.g., college prep., general, etc.).	.26	.07	.00	.01	23.61	1.25 (n.s.)
6. Recommendation from counselor.	.26	.07	.00	.00	23.73	1.05 (n.s.)

*$p \leq .05$

Table 4.41

Summary of Multiple Regression Analysis Relating Prerequisites Considered Important When Enrolling Students in Non-required Science Courses and Enrollment of Black Female Students in Non-required Science Courses (N=99)

	R	R^2	R^2 Change	Adjusted R^2	Standard Error	F
1. Recommendation from counselor.	.20	.04	X	.03	20.23	3.89 (n.s.)
2. Recommendation from teacher.	.23	.05	.01	.03	20.20	2.57 (n.s.)
3. Student expressed career interest.	.27	.07	.02	.04	20.11	2.33 (n.s.)
4. Program of study (e.g., college prep., general, etc.).	.30	.09	.02	.05	20.01	2.26 (n.s.)
5. Grade point average in previous science course.	.31	.10	.01	.05	20.04	1.95 (n.s.)
6. Cumulative grade point average.	.32	.10	.01	.04	20.08	1.71 (n.s.)

*$p \leq .05$

As reported in Table 4.41, the results of the analysis between the "prerequisites" variables and the enrollment of black female students in non-required science courses were not statistically significant. The multiple correlation coefficient (R) of .32 was not statistically significant; consequently, the amount of variance explained by the variables was not significantly different from zero.

Frequencies of requests for assistance. The analysis of requests for assistance about taking non-required mathematics and science courses and enrollment in non-required mathematics and science courses is reported in Table 4.42. The relationship between the variables was not statistically significant at the .05 level.

Special efforts. The analysis of special efforts used to encourage black female students and enrollment of black females in non-required mathematics and science courses is presented in Tables 4.43 and 4.43a. The association between these variables was statistically significant at the .05 level when related to enrollment of black female students in non-required mathematics courses. The observed and expected values of the variable, "special efforts," when related to enrollment in mathematics are shown in Table 4.43a. The expected values are used as a mean for comparing the actual numbers (observed values) which represent the data collected during the survey.

In contrast to the significant relationship between special efforts and enrollment in mathematics, the relationship between

Table 4.42

Students Request Assistance About Taking Non-required Mathematics and Science Courses and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Mathematics		Students Request Assistance			
		Sometimes	Frequently	Very Often	Total
	F	21	6	4	31
0-10%	r	67.7	19.4	12.9	
Low Enrollment	c	41.2	22.2	22.2	
	T	21.9	6.3	4.2	32.3
	F	17	13	6	36
11-30%	r	47.2	36.1	16.7	
Medium Enrollment	c	33.3	48.1	33.3	
	T	17.7	13.5	6.3	37.5
	F	13	8	8	29
31-100%	r	44.8	27.6	27.6	
High Enrollment	c	25.5	29.6	44.4	
	T	13.5	8.3	8.3	30.2
Column		51	27	18	96
Total		53.1	28.1	18.8	100.0
	X^2=5.38	4df	Probability Level=.2503		N.S.

Science		Students Request Assistance			
		Sometimes	Frequently	Very Often	Total
	F	23	9	5	37
0-10%	r	62.2	24.3	13.5	
Low Enrollment	c	45.1	34.6	27.8	
	T	24.2	9.5	5.3	38.9
	F	16	7	5	28
11-25%	r	57.1	25.0	17.9	
Medium Enrollment	c	31.4	26.9	27.8	
	T	16.8	7.4	5.3	29.5
	F	12	10	8	30
26-100%	r	40.0	33.3	26.7	
High Enrollment	c	23.5	38.5	44.4	
	T	12.6	10.5	8.4	31.6
Column		51	26	18	95
Total		53.7	27.4	18.9	100.0
	X^2=3.71	4df	Probability Level=.4460		N.S.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

Table 4.43

Special Efforts and Enrollment of Black Female Students in Non-required Mathematics and Science Courses

Mathematics		Special Efforts				
		No Efforts	Routine	Routine & Special	Special	Total
0-10% Low Enrollment	F	10	10	3	1	24
	r	41.7	41.7	12.5	4.2	
	c	47.6	43.5	18.8	6.7	
	T	13.3	13.3	4.0	1.3	32.0
11-25% Medium Enrollment	F	7	10	4	6	27
	r	25.9	37.0	14.8	22.2	
	c	33.3	43.5	25.0	40.0	
	T	9.3	13.3	5.3	8.0	36.0
26-100% High Enrollment	F	4	3	9	8	24
	r	16.7	12.5	37.5	33.3	
	c	19.0	13.0	56.3	53.3	
	T	5.3	4.0	12.0	10.7	32.0
Column Total		21	23	16	15	75
		28.0	30.7	21.3	20.0	100.0
	X^2=16.9		6df	Probability Level=.0127		$p<.05$

Science		Special Efforts				
		No Efforts	Routine	Routine & Special	Special	Total
0-10% Low Enrollment	F	8	12	7	1	28
	r	28.6	42.9	25.0	3.6	
	c	38.1	52.2	43.8	7.1	
	T	10.8	16.2	9.5	1.4	37.8
11-30% Medium Enrollment	F	6	8	2	5	21
	r	28.6	38.1	9.5	23.8	
	c	28.6	34.8	12.5	35.7	
	T	8.1	10.8	2.7	6.8	28.4
31-100% High Enrollment	F	7	3	7	8	25
	r	28.0	12.0	28.0	32.0	
	c	33.3	13.0	43.8	57.1	
	T	9.5	4.1	9.5	10.8	33.8
Column Total		21	23	16	14	74
		28.4	31.1	21.6	18.9	100.0
	X^2=12.56		6df	Probability Level=.0505*		N.S.

*More than 20% of the cells (3) had expected frequencies less than 5.

Legend: F=observed frequency
r=row percentage
c=column percentage
T=percentage of total sample

Table 4.43a

Observed and Expected Frequencies for Special Efforts and Enrollment of Black Female Students in Non-required Mathematics Courses

	No Efforts	Routine	Routine & Special	Special
0-10% Low Enrollment	O 10	O 10	O 3	O 1
	E 6.7	E 7.4	E 5.1	E 4.8
11-25% Medium Enrollment	O 7	O 10	O 4	O 6
	E 7.6	E 8.3	E 5.8	E 5.4
26-100% High Enrollment	O 4	O 3	O 9	O 8
	E 6.7	E 7.4	E 5.1	E 4.8
Total	21	23	16	15

Legend: O=Observed frequency
E=Expected frequency

special efforts and enrollment of black female students in non-required science courses only approached statistical significance (X^2=12.56, 6df, p=.0505). In this case, more than 20 percent of the cells had expected frequencies less than 5. Therefore, the assumptions underlying the chi square test were not met.

Discussion

The analyses of counseling and guidance practices and enrollment of black female students in non-required mathematics and science courses allow one to state that only one variable, "special efforts . . .," was statistically significant at the .05 level when related to enrollment in mathematics. Five of the "amount of involvement counselors report in specific counseling and guidance practice activities" variables were statistically significant at the .05 level when related to enrollment in science courses. The variable, "special efforts . . ." approached significance when related to enrollment of black female students in non-required science courses (X^2=12.56, 4df, p=.0505). In this case, more than 20 percent of the cells had expected frequencies less than 5. Therefore, the assumptions underlying the chi square test were not met.

Special efforts. The variable, "special efforts used to encourage black female students to enroll in non-required mathematics courses in relationship to enrollment in mathematics," was statistically significant at the .05 level (X^2=16.19, 6df, p=.0127). In the "low enrollment" category, according to data reported in Table 4.43a, both the "no effort" and "routine effort" groups had observed values of 10 and expected values of 6.7 and 7.4, respectively. Thus, the observed values were greater than the expected values. In the "high enrollment" category, the "routine and special efforts" and "special efforts" groups had observed values of 9 and 8, and expected values of 5.1 and 4.8. Again, the observed values were greater than the expected values. Thus, these findings allow the suggestion that more counselors reported using "routine and special efforts" and "special efforts" than was expected in the "high enrollment" category. On the other hand, more counselors reported "no efforts" or "routine efforts" than was expected in the "low enrollment" category.

Amount of involvement. Nine variables were used to measure the involvement counselors reported in specific counseling and guidance practice activities. Five of the variables were statistically significant at the .05 level: (a) providing career day programs; (b) counseling students in developing their special abilities; (c) recommending readings (e.g., in the library) about various careers; (d) providing audio-visual aids as a means of acquainting students with careers; and (e) assisting students in selecting their high school courses. The variable, "providing career day programs," was reported as Step One in the stepwise regression procedure. This finding allows the suggestion that counselors who "provide career day services" tend to encourage black females to enroll in non-required science courses.

While all nine variables were reported in the summary table, only five of them were statistically significant. This means that the following four variables did not have F-ratio values high enough to be statistically significant at the .05 level: (a) assisting students in selecting a program of study (e.g., college prep., general, etc.); (b) assisting students with career development (e.g., occupational choice, post high school work, etc.); (c) meeting with teachers regarding specific students; and (d) organizing field trips for students. Thus, it is apparent that the "amount of involvement . . ." variables had some relationship to the enrollment of black female students in non-required science courses.

Summary Discussion of Research Questions

A few factors that contribute to the enrollment of black female students in non-required mathematics and science courses can be identified from the results of the present study. The relationship of the dependent variable, "enrollment of black female students in non-required mathematics courses," to four of the six "autonomy of counselors" variables (characteristics of guidance programs) and the "special efforts . . ." variable (counseling and guidance practices), was statistically significant at the .05 level. The four significant "autonomy of counselors" variables were: (a) developing programs that will provide assistance to special populations (e.g., females); (b) developing procedures for reporting student progress to parents; (c) establishing the criteria for students taking non-required mathematics and science courses; and (d) establishing student conduct rules in the school. One other variable, "undergraduate major," (demographic characteristics of counselors) approached statistical significance when related to the enrollment of black female students in non-required mathematics courses (X^2=9.47, 4df, p=.0503).

The relationship of the dependent variable, "enrollment of black female students in non-required science courses," to five of the "autonomy of counselors" variables (characteristics of guidance programs) and five of the "amount of involvement . . ." variables (counseling and guidance practices) was statistically significant at the .05 level. In this case, the five "autonomy of counselors" variables were: (a) developing programs that will provide assistance to special population groups (e.g., females); (b) establishing student conduct rules in the school; (c) establishing criteria for students taking non-required mathematics and science courses; (d) developing procedures for reporting student progress to parents; and (e) transferring students to programs or courses that will better match their abilities and interests. The five significant "amount of involvement . . ." variables included: (a) providing career day programs; (b) counseling students in developing their special abilities; (c) recommending readings (e.g., in the library) about various careers; (d) providing audio-visual aids as a means of acquainting students with careers; and (e) assisting students in selecting their high school courses.

Three other variables approached significance when related to enrollment in science. For instance, in the category demographic characteristics of counselors, the variables, "number of years of counseling experience" (X^2=9.24, 4df, p=.0553), and "number of college credits in counseling minority students" (X^2=9.24, 2df, p=.0727) approached statistical significance. In the category characteristics of guidance programs, the variable, "counselor/student ratio" approached statistical significance (X^2=9.47, 4df, p=.0503). And in the category, counseling and guidance practices, the variable, "special efforts . . ." approached statistical significance (X^2=.1256, 4df, p=.0505). However, more than 20 percent of the cells had expected frequencies less than 5. Therefore, the assumptions underlying the chi square test were not met.

Given the three categories of variables used in this study and the enrollment of black female students in non-required mathematics and science courses, only the "autonomy of counselors" variables (characteristics of guidance programs) contributed to counselors actually enrolling black female students in both mathematics and science courses. In the category, counseling and guidance practices, the "special efforts . . ." variable was statistically significant in relation to enrollment in non-required mathematics courses. In the same category (counseling and guidance practices), the "amount of involvement . . ." variables were significant to the enrollment in non-required science courses.

CHAPTER V

SUMMARY, LIMITATIONS, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This chapter is divided into five sections. The study is summarized in the first section; the limitations are presented in the second section, the conclusions in the third section, the implications in the fourth section, and the recommendations in the fifth section.

Summary

The summary has three parts: the background and statement of the problem, methodological procedures, and results.

Background and Statement of the Problem

The underrepresentation of black females in mathematics and science has caused some educators to ask questions regarding the role of school counselors in contributing to the problem. Burlew (1977) reported that black females are represented by less than 1 percent in male-dominated professions (e.g., medicine, law, engineering, etc.). Thus, an important question is, "What can school counselors do to encourage black females to enroll in non-required mathematics and science courses that will prepare them for such careers?"

Some researchers report that counselors discourage females in general from taking mathematics and science courses (Casserly, 1975; Luchins, 1977). Some counselors themselves have admitted that they need help in encouraging females, especially black females, to enroll in non-required mathematics and science courses. The purpose of this investigation was to examine the relationship between selected characteristics and activities of school counselors and the enrollment of black female students in non-required mathematics and science courses. Specifically, the investigator sought to determine whether the enrollment of black females in non-required mathematics and science courses varies systemically according to the demographic characteristics of counselors, the characteristics of guidance programs, and counseling and guidance practices.

Methodology

The procedure employed for data collection was a direct mail survey. This procedure and the schools selected were determined by the project director in the Research and Development Center for Individualized Schooling.* Questionnaires were mailed to designated coordinators in each of the 46 schools. A coordinator in each school was responsible for the administration and collection of all questionnaires. Confidentiality was assured by asking the participants to replace the questionnaire in the envelope and seal it before returning it to the coordinator.

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*Project on Minority Female Involvement In High School Science and Mathematics. Funded by NIE under Grant No.: NIE-G-79-0110.

The sample for this study was 125 secondary school counselors and guidance directors in 46 schools located in 10 states throughout the United States. The participants ranged in age from 26-66 years and in number of years in present position from 1-28 years. Since this study was part of a larger study conducted by the Wisconsin Research and Development Center for Individualized Schooling, the selection of schools was made by the project director. As shown in Table 3.1, three types of schools were selected (i.e., predominantly black, predominantly white, and desegregated). The number of counselors from each type of school are shown in Table 3.1.

The counselors who completed the survey in its entirety represent 79 percent of the counselors who were originally sampled. Of the 157 questionnaires sent to counselors and guidance directors, 132 (84 percent) were returned. Seven of these were inappropriate for the purpose of the study because respondents were not full-time secondary school counselors or because respondents failed to respond to most of the questions. The remaining 125 (79 percent) questionnaires were used for descriptive information about the sample. However, not all of these could be used to answer the research questions. Twenty-five of the respondents did not answer the question related to enrollment of black females in mathematics courses; and 26 did not answer the question related to enrollment of black females in science. Thus, the descriptive statistics herein describe the total usable sample (N=125), but the results of the statistical tests (chi square and forward stepwise regression) are based only on the responses from those counselors who answered the questions related to the dependent variables, "enrollment of black females in non-required mathematics courses" (N=100), and "enrollment of black females in non-required science courses" (N=99).

Several statistical analyses were used in examining the data. Parametric and non-parametric statistical measures were used in answering the three research questions:

(a) Measures of central tendency (i.e., mean) and variability (i.e., standard deviation and range) were used to examine quantitative variables; percentages and frequencies were used to report non-quantitative variables.

(b) Chi square and forward stepwise multiple regression analyses were used to determine what counseling and guidance factors had significance relative to the enrollment of black females in non-required mathematics and science courses.

The level of significance for this research was .05 percent. The investigator used this level for the purpose of reporting the analyses that follow.

Results

The relationship between the enrollment of black female students in non-required mathematics and science courses and the demographic characteristics of counselors was the focus of research question one. None of the variables were statistically significant at the .05 level when applying chi square analysis. However, one variable, "undergraduate major," approached statistical significance for the enrollment of black female students in non-required mathematics courses (X^2=12.45, 6df, p=.0527). Two other variables, "number of college credits in counseling minority students," and "number of years of full-time counseling experience," also approached statistical significance for the enrollment of black female students in non-required science courses (X^2=5.24, 2df, p=.0727; X^2=9.24, 4df, p=.0553, respectively). The demographic characteristics of counselors seemed to make little difference in the enrollment of black females in non-required mathematics and science courses.

The relationship between the characteristics of guidance programs and the enrollment of black female students in non-required mathematics and science courses was the thrust of research question two. Chi square analysis was used to examine two of the relationships (organization of guidance programs and counselor/student ratio) and forward stepwise multiple regression analysis was used to examine the other relationships (philosophy of guidance programs and autonomy of counselors). The "autonomy of counselors" variables were the only variables statistically significant at the .05 level when related to both dependent variables. Four of the six variables were statistically significant at the .05 level when related to enrollment in mathematics: (a) developing programs that will provide assistance to special populations (e.g., females); (b) developing procedures for reporting student progress to parents; (c) establishing the criteria for students taking non-required mathematics and science courses; and

(d) establishing student conduct rules in the school. Five of the six variables were statistically significant when related to enrollment of black female students in non-required science courses: (a) developing programs that will provide assistance to special population groups (e.g., females); (b) establishing student conduct rules in the school; (c) establishing the criteria for cut-off scores for placement of students in non-required science and mathematics courses; (d) developing procedures for reporting student progress to parents; and (e) transferring of students to programs or courses that will better match their abilities and interests. The variable, "establishing criteria for students taking non-required courses in mathematics and science," was omitted from the summary table by the program because the computed F-ratio was insufficient for inclusion. The variable, "developing programs that will provide assistance to special populations (e.g., females)," was reported as Step One in the forward stepwise multiple regression procedure when related to both dependent variables, "enrollment of black female students in non-required mathematics courses," and "enrollment of black female students in non-required science courses." Another variable, "counselor/student ratio," approached statistical significance with the enrollment of black female students in science (X^2=9.47, 4df, p=.0503).

The relationship between the enrollment of black female students in non-required mathematics and science and counseling and guidance practices was the focus of research question three. Forward stepwise multiple regression was used to examine three of the relationships: (a) amount of involvement counselors report in specific counseling and guidance practice activities; (b) amount of time counselors spend with students in educational and career planning, personal and/or social adjustment and other job related activities; and (c) prerequisites considered most important when enrolling students in non-required mathematics and science courses. And chi square analysis was used to examine the other relationships: (a) how often students (black females) request assistance about taking non-required mathematics and science courses; and (b) special efforts used to encourage black female students to enroll in non-required mathematics and science courses. Only one variable, "special efforts . . ." was statistically significant at the .05 level with the enrollment in non-required mathematics courses.

Five of the nine "amount of involvement counselors report in specific counseling and guidance practice activities" variables were statistically significant at the .05 level with the enrollment of black female students in non-required science courses. These variables included: (a) providing career day programs; (b) counseling students in developing their special abilities; (c) recommending readings (e.g., in the library) about various careers; (d) providing audio-visual aids as a means of acquainting students with careers; and (e) assisting students in selecting their high school courses. The other four variables were reported in the summary table, but their F-ratio values were not high enough to be statistically significant.

These variables included: (a) assisting students in selecting a program of study (e.g., college prep., general, etc.); (b) assisting students with career development (e.g., occupational choice, post high school work, etc.); (c) meeting with teachers regarding specific students; and (d) organizing field trips for students. The variable, "special efforts . . ." approached statistical significance with the enrollment in non-required science (X^2=12.56, 4df, p=.0505). In this case, more than 20 percent of the cells had expected frequencies less than 5. Therefore, the assumptions underlying the chi square test were not met.

From these findings, only the "autonomy of counselors" variables contributed to counselors actually enrolling black female students in both non-required mathematics and science courses. The variable, "special efforts . . ." contributed to counselors enrolling black females in non-required mathematics courses. And the "amount of involvement . . ." variables contributed to counselors actually enrolling black female students in non-required science courses.

Limitations

The following limitations were recognized in conducting and analyzing the data for the study:

First, only the face validity of the instrument was examined in a pilot study using a sample of 10 secondary school counselors.

Second, the questionnaire was especially long. As a result, some of the respondents failed to answer several of the questions. In addition, there was no way to control for conscious or unconscious biases of the respondents regarding the nature of the study (i.e., on minorities research).

Third, questions pertaining to the dependent variables and some independent variables requested estimated percentages instead of actual numbers. As a result, 25 of the respondents did not answer the dependent variable in relationship to mathematics and 26 did not answer the dependent variable in relationship to science.

Fourth, the timing of the data collection resulted in a lower return rate from some schools than was expected because some counselors were involved in other activities (e.g., fall registration, closing out school year records). Inasmuch as the majority of the questionnaires were mailed about the same time, some schools (i.e., South and Southwest) closed earlier than schools in the East, Midwest, and West.

Fifth, the enrollment data were obtained by counselors on the basis of their own students enrolled in non-required mathematics and science courses. Thus, there was no independent check of the counselors' report against actual enrollment data.

Conclusions

There is always a danger in drawing misleading conclusions from any research data. Different results may come from stronger data and designs; measurement of additional variables might also produce significant side-effects or unanticipated consequences. Clearly, the danger is magnified for the data addressed in this study, where results are weak and relevant studies are few for relating enrollment of black female students in non-required mathematics and science courses to the demographic characteristics of counselors, characteristics of guidance programs, and counseling and guidance practices.

Based on the results of the analyses for this study the following conclusions are forwarded:

One, the demographic characteristics of counselors do not contribute to the variance in enrollment of black female students in non-required mathematics and science courses. Thus, we conclude that if counselors have an impact on enrollment it is not related to ethnic background, sex, age, academic background, or professional experience.

Two, the specific characteristics of guidance programs play a relatively minor role in the enrollment of black female students in mathematics and science courses. Only the "autonomy of counselors" variables contributed to the variance in enrollment of black female students in mathematics and science courses. Thus, we conclude that counselors who are free to make decisions and participate in decision making and policy planning for students in general may also do some things that encourage black females to enroll in non-required mathematics and science courses.

Three, the counseling and guidance practices used by counselors to some extent contribute to the variance in enrollment of black female students in mathematics and science courses. A statistically significant relationship existed between five of the "amount of involvement . . ." variables and enrollment of black female students in non-required science courses: (a) providing career day programs; (b) counseling students in developing their special abilities; (c) recommending readings (e.g., in the library) about various careers; (d) providing audio-visual aids as a means of acquainting students with careers; and (e) assisting students in selecting their high school courses. One other statistically significant relationship was found to exist between the variable "special efforts . . ." and enrollment of black female students in non-required mathematics courses. Thus, we can conclude that counselors who use many alternatives in working with students may encourage more black females to enroll in non-required mathematics and science courses.

From the results of the analyses, only limited ideas or patterns for adding to our understanding about the relationship between the enrollment of black female students in non-required mathematics and science courses were revealed. These results, however, might help other researchers to design more focused studies by being aware of the small number of variables they should consider for future research.

Implications

The purpose of this investigation has been to determine the relationship between selected characteristics and activities of school counselors and the enrollment of black females in non-required mathematics and science courses. From the results of this study, implications for secondary school counselors and guidance directors and for future research are suggested.

Implications for Secondary School Counselors and Guidance Directors

1. Counselors who enjoy a high degree of autonomy will most likely implement creative approaches that are needed for the enrollment of black females in non-required mathematics and science courses.
2. Increases in the number of black females in mathematics and science related careers will not be achieved through incidental, traditional guidance programs and practices. Specific active measures must be utilized. Whatever measures counselors choose to use can be continued if they prove effective and discontinued if evaluations indicate lack of tangible results.
3. Pre-service training to equip future counselors to deal more knowledgeably with the enrollment of black females in non-required mathematics and science courses should be encouraged.

Implications for Future Research

The demonstration of how counseling and guidance factors might have impressive effects on enrollment of black female students in non-required mathematics and science courses remains for future researchers. The scope of the present study was limited. It did, however, yield some specific suggestions for further research on the subject.

1. The questions which required the respondents to supply actual numbers or percentages, in many instances, were not answered or answered incompletely or incorrectly. These questions should be replaced with questions requesting respondents to check off a category. This type of procedure would result in more reliable data.
2. The length of the questionnaire should be reduced by eliminating any questions that were not directly related to the three research questions. These include several questions pertaining to the total research project but not used in this investigation (Questions 2, 5a,b,h,j, and k, 10c-d, 16, 19, and 20); and questions used for exploratory purposes and future research (Questions 7, 8, 9, 12, and 17). None of the latter questions when related to enrollment of black females in mathematics and science yielded significant results.
3. Expanding the sample to more big city schools would result in a more representative distribution of responses.

4. It was suggested during the early stages of the questionnaire design that information regarding white and other females should also be requested for a comparative base. This suggestion was followed, but revealed few findings that would suggest future research. It appeared, after exploring the data, that the respondents did not make a great distinction among the categories (e.g., black, white, and other females). While future research might reveal similar findings, it may also generate questions for additional research.
5. Future research might also use longitudinal studies of black females' enrollment in non-required mathematics and science courses. In this way, patterns or trends of enrollment could be observed that might be useful for secondary school counselors. Also, longitudinal studies might allow for some experimental designs to test certain behavior patterns of school counselors and black females. This type of approach might answer the question, "Is it the counselor or the students who most determine enrollment in non-required mathematics and science courses?"

Recommendations

Although several variables approached statistical significance when related to enrollment of black female students in non-required mathematics or science courses, one variable in particular warrants further study. Seventy-nine (63.2 percent) of the counselors in this study reported that they had no college credits in counseling minority students. Thus, it was impossible to determine from this sample of counselors if taking such courses made a difference in the extent to which counselors encouraged enrollment of black female students in non-required mathematics and science courses. It is, of course, important to find out if such courses have positive effects. Therefore, it is recommended that further research be undertaken, comparing counselors who have and have not taken courses in counseling minority students in order to determine if such courses make a difference in the counselors' encouragement of black females to enroll in non-required mathematics and science courses.

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APPENDIX A

COUNSELOR QUESTIONNAIRE

COUNSELOR QUESTIONNAIRE

This questionnaire should be completed by full time secondary school counselors and guidance directors.

NAME OF SCHOOL ______________________________

LOCATION ______________________________
City State

DATE ____________________

WISCONSIN RESEARCH AND DEVELOPMENT CENTER
FOR INDIVIDUALIZED SCHOOLING
UNIVERSITY OF WISCONSIN · MADISON SCHOOL OF EDUCATION
1025 W Johnson Street Madison, Wisconsin 53706 (608) 263-4200

April 16, 1980

Dear Counselor:

This questionnaire is part of a study being conducted by the University of Wisconsin's Research and Development Center. Selected counselors and guidance directors in many secondary schools throughout the U.S. will complete the questionnaire to determine how counselors are involved with black females' participation in non-required mathematics and science courses. Your help in answering this questionnaire will assist in improving guidance services for special populations (e.g., black females).

The information requested will be used only by the investigators. No one in the school system and no one who knows you will ever see your individual answers. If your school desires a report of the final results, it will be provided. Your participation, of course, is completely voluntary. While we hope you will answer all questions, if there is a particular question that you wish not to answer, you may omit it. When you are finished, put the questionnaire in the envelope and seal it. Then give it to the coordinator, who will send the questionnaires directly to the University of Wisconsin's Research and Development Center.

Cora B. Marrett

Cora B. Marrett, Ph.D.
Project Director

Counselor Questionnaire

GENERAL DIRECTIONS

In most cases you will be asked a question followed by a number of alternative responses. For each question, place a check in the category which corresponds to your response. In a few cases, you will be asked to record actual numbers or percentages. Please answer all questions as accurately as you can.

SECTION I

Characteristics of Guidance Program

1. Which one of the following best describes the organization of your school counseling and guidance programs? (Check one)

   ___a. Students are assigned alphabetically to counselors.

   ___b. Counselors are assigned to a single grade level year after year (e.g., 10th grade counselor year after year).

   ___c. Counselors are assigned to an entering class and remain with that class until it graduates.

   ___d. Students are assigned randomly to counselors, without regard to alphabet, grade or entering class.

   ___e. Counselors are considered specialists in various areas (e.g., career development, testing, etc.) and a student chooses a counselor according to his/her needs.

   ___f. Other (specify) ______________________________

2. As you evaluate your effectiveness as a counselor, how important is each of the following to you?

	Very Unimportant	Unimportant	Important	Very important
a. The performance of your students on standardized achievement tests.	___	___	___	___
b. The number of your female students who choose high school courses which traditionally have had few females.	___	___	___	___
c. The number of your students who enroll in college.	___	___	___	___
d. The number of your students who elect non-required science courses.	___	___	___	___
e. The number of times teacher turns to you for advice on particular students.	___	___	___	___
f. The proportion of your students who complete high school.	___	___	___	___

3. How important is each of the following to the counseling and guidance program in your school?

	Very Unimportant	Unimportant	Important	Very Important	Don't Know
a. Providing individual and group data about students for school wide program planning and development.	____	____	____	____	____
b. Reducing and eliminating maladative behavior of students (e.g., truancy, classroom misconduct, etc.).	____	____	____	____	____
c. Providing equal opportunity for all students.	____	____	____	____	____
d. Providing remedial services for students with special educational needs.	____	____	____	____	____
e. Providing career development activities for all students.	____	____	____	____	____
f. Promoting value clarification and self-awareness for all students.	____	____	____	____	____
g. Promoting problem-solving and decision making skills for all students.	____	____	____	____	____
h. Working with parents and community agencies to meet students' needs.	____	____	____	____	____

4. How many students currently are assigned to you for counseling and guidance?

a. _______ students

b. _______ No assignment made in this school

5. In your school, what is your involvement in each of the following?

	No involvement	Little involvement	Some involvement	Substantial involvement
a. The hiring of professional staff members.	____	____	____	____
b. The development of the budget for your department, unit, or program.	____	____	____	____
c. The establishment of student conduct rules in the school.	____	____	____	____
d. The establishing of the criteria for students taking nonrequired courses in mathematics and science.	____	____	____	____
e. The transfering of students to programs or courses that will better match their abilities and interests.	____	____	____	____
f. The developing of programs that will provide assistance to special population groups (e.g., for females)	____	____	____	____
g. The establishing of the criteria for cut off scores for placement of students in non-required science and mathematics courses.	____	____	____	____
h. The determination of procedures to be used for evaluating teachers.	____	____	____	____
i. The development of procedures for reporting student progress to parents.	____	____	____	____
j. The evaluation of other staff members.	____	____	____	____
k. The setting of goals for your unit or program.	____	____	____	____

6. In an average year, how much of your time do you spend on each of the following activities?

	None of my time	A little of my time	Some of my time	A lot of my time
a. Assisting students in selecting their high school courses.	_____	_____	_____	_____
b. Assisting students in selecting a program of study (e.g., college prep., general, etc.)	_____	_____	_____	_____
c. Counseling students in developing their special abilities.	_____	_____	_____	_____
d. Organizing field trips for students.	_____	_____	_____	_____
e. Assisting students with career development (e.g., occupational choice, college choice, post high school work, etc.)	_____	_____	_____	_____
f. Providing career day programs	_____	_____	_____	_____
g. Providing audio-visual aids as a means of acquainting students with careers.	_____	_____	_____	_____
h. Recommending readings (e.g., in the library) about various careers.	_____	_____	_____	_____
i. Meeting with teachers regarding specific students.	_____	_____	_____	_____

SECTION II

Characteristics of Students

7. Considering all of the students assigned to you as 100%, how are they distributed in the following categories?

a. Black females _______%

b. Black males _______%

c. White females _______%

d. White males _______%

e. Other females _______%

f. Other males _______%

100%

8. Of the female students assigned to you, how many during an average week are you likely to have some contact with in an individual or small group setting? Place a check in the appropriate category.

	None	Some but fewer than 10	10-19	20-29	30-39	40-49	50-59	60-69	70 or more
a. Black females	___	___	___	___	___	___	___	___	___
b. White females	___	___	___	___	___	___	___	___	___
c. Other females	___	___	___	___	___	___	___	___	___

9. Of the female students assigned to you, about how many seek you out for counseling assistance?

	None of them	A few of them	About one-half of them	Most of them	All of them	Does not apply
a. Black females	___	___	___	___	___	___
b. White females	___	___	___	___	___	___
c. Other females	___	___	___	___	___	___

10. During this school year, about what percentage of the females you had contact with (i.e., individually or in small groups) enrolled in at least one non-required mathematics and/or science course?

Black females

a. ____% black females enrolled in non-required mathematics courses.

b. ____% black females enrolled in non-required science courses.

White females

c. ____% white females enrolled in non-required mathematics courses.

d. ____% white females enrolled in non-required science courses.

Other females

e. ____% other females enrolled in non-required mathematics courses.

f. ____% other females enrolled in non-required science courses.

11. During this year, about what percentage of the females you did not have contact with (i.e., individually or in small groups) enrolled in at least one non-required mathematics and/or science courses?

Black females

a. _____% black females enrolled non-required mathematics courses.

b. _____% black females enrolled in non-required science courses.

White females

c. _____% white females enrolled in non-required mathematics courses.

d. _____% white females enrolled in non-required science courses.

Other females

e. _____% other females enrolled in non-required mathematics courses.

f. _____% other females enrolled in non-required science courses.

12. Considering the female students assigned to you this year, generally how would you rate their academic ability in mathematics and science?

Performance in Mathematics

	Below Aver.	Slightly Below Aver.	Average	Slightly Above Aver.	Above Aver.
a. Black females	____	____	____	____	____
b. White females	____	____	____	____	____
c. Other females	____	____	____	____	____

Performance in Science

	Below Aver.	Slightly Below Aver.	Average	Slightly Above Aver.	Above Aver.
a. Black females	____	____	____	____	____
b. White females	____	____	____	____	____
c. Other females	____	____	____	____	____

SECTION III

Counseling and Guidance Practices

13. When assisting the female students assigned to you, about what percentage of your time with them is spent in each of the following areas? (Entries in a, b, c, and d should total 100% in each column.)

	Black Females	White Females	Other Females
a. Assisting students in high school educational planning (e.g., chourse and program selection).	____%	____%	____%
b. Assisting students in career planning (e.g., occupational choice, college choice, etc.)	____%	____%	____%
c. Assisting students with personal and/or social adjustments.	____%	____%	____%
d. Other	____%	____%	____%
	100%	100%	100%

14. At your school, which of the following prerequisites are considered most important when enrolling students in non-required mathematics and science courses? Check as many that apply.

Non-required science courses	Non-required mathematics courses
___a. culmative grade point average	___a. culmative grade point average
___b. grade point average in previous science courses	___b. grade point average in previous mathematics courses
___c. program of study (e.g., college prep, general, etc.)	___c. program of study (e.g., college prep, general, etc.)
___d. recommendation from counselor	___d. recommendation from counselor
___e. recommendation from teacher	___e. recommendation from teacher
___f. student expressed career interest	___f. student expressed career interest
___g. other (specify) ______________ ______________________	___g. other (specify) ______________ ______________________

15. How often does each of the following groups of students request assistance from you in making decisions about taking non-required mathematics and science?

	Never	Sometimes	Frequently	Very often
a. Black females	____	____	____	____
b. White females	____	____	____	____
c. Other females	____	____	____	____

16. In your opinion, how important is each of the following for explaining the low enrollment nationally of black female students in high school mathematics and science?

	Very Un-important	Somewhat Un-important	Somewhat Important	Very Import.	Don't Know
Absence of information on careers or jobs requiring math and science.	____	____	____	____	____
Perceived difficulty of coursework in math and science.	____	____	____	____	____
Lack of parental interest in math and science.	____	____	____	____	____
Lack of support from close friends.	____	____	____	____	____
Greater interest in social service than in math and science careers.	____	____	____	____	____
Lack of encouragement from counselors.	____	____	____	____	____
Failure to consult counselors or teachers.	____	____	____	____	____
Stereotyping of mathematics and science as male domains.	____	____	____	____	____

17. This school year, how effective do you think you have been in encouraging black females to take non-required courses in mathematics and science?

_____a. not at all effective

_____b. not very effective

_____c. somewhat effettive

_____d. very effective

_____e. don't know

18. During this school year, describe any special efforts that have been used (i.e., individual counselors or programs) to encourage black females to enroll in non-required mathematics and science courses.

SECTION IV

19. Thinking of your role as a counselor in your school, how satisfied are you with each of the following?

	Very Dis-satisfied	Dis-Satis-fied	Satis-fied	Very Satis-fied
a. The number of students for whom you are responsible.	____	____	____	____
b. The extent to which you are able to meet your students' academic needs.	____	____	____	____
c. The amount of interaction between teachers and counselors in your school.	____	____	____	____
d. The amount of work you are expected to do.	____	____	____	____
e. The academic performance of black students in your school.	____	____	____	____
f. The academic reputation your school has in this community.	____	____	____	____
g. The relationship you have with your students.	____	____	____	____
h. The counseling services your school provides.	____	____	____	____
i. The number of black students enrolled in non-required mathematics and science courses.	____	____	____	____

20. Over a two-month period, approximately how many hours are you likely to spend in the following?

a. Meetings of the entire school staff _______ hrs.

b. Meetings of a department or unit in the school _______ hrs.

c. Meetings of a pupil-personnel team _______ hrs.

d. Meetings of staff committees _______ hrs.

SECTION V

Personal data

21. Which one of the following ethnic designations best describes you?

____1. American Indian, Native American
____2. Black, Afro-American, Negro
____3. Chicano, Mexican American, Hispanic
____4. Oriental, Asian American
____5. Puerto Rican
____6. White, Caucasian
____7. Other (specify) ____________________

22. What is your sex?

____a. Male ____b. Female

23. How old were you on your last birthday? ________________

24. What is the highest earned college degree you hold? (Do not report honorary degrees).

Degree: ____________________

25. Have you completed a Master's degree in Guidance and Counseling or a related discipline (e.g., Psychology)?

____1. Yes ____2. No

26. What was your major in undergraduate school? (If you had two majors, list the one in which you took most courses. If you received a degree in Education, please specify the areas.) ____________________________

27. How many college credits (semester equivalent do you have in.....

a. Counseling minority students: ______#

b. Vocational/Career development: _______#

28. This year, what is your position in this school?

____1. School Counselor ____2. Guidance Director ____3. Other ____________

29. As of the end of this school year, how many years will you have been employed in your present position in this school? ____________#

30. What is the total number of years of full-time counseling experience you have had? ____________#

31. What is the total number of years of teaching experience you have had?

________________#

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